

T H E  
BRITISH PALLADIUM:

O R

*Annual Miscellany of Literature and Science,*

For the YEAR 1777.

THE TWENTY-NINTH NUMBER PUBLISHED.

In TWO PARTS.

The FIRST containing NOTES, MEMORANDUMS,  
OBSERVATIONS, and TABLES for the YEAR:

With *interesting* SUBJECTS annexed, *viz.*

The *Principles* and *Rudiments* of GEOGRAPHY continued;  
or, a *Natural* and *Historical* ACCOUNT of our  
*Terraqueous* GLOBE.

The SECOND comprehending ANSWERS to *Queries* and  
*Enquiries* in the former YEAR's PALLADIUM:

With new *QUERIES* and *ENQUIRIES* (*Natural, Historical,*  
*Poetical, Philosophical, Arithmetical, Geographical,*  
*Analytical, and Mathematical*) for the present YEAR.

For general Use and Improvement of BOTH SEXES.

Particularly useful in Schools and Academies, and in Navigation.

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BY THE PALLADIUM AUTHOR.

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THO' last Year's Prizes Foes to Right || detained,  
Still the Prize-Honours † have been justly gained:  
While Shame and Glory stand upon Record,  
The Man of Worth the Worthy shall reward. *Semper Idem.*

|| Trustees. † Manilla Ransom was never paid, thro' the Fraud of  
Spanish Trustees, yet the Conquerors have enjoyed their Laurels.

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[Price One Shilling and Three Pence.]

THE BRITISH PALLADIUM, OR  
*Natural and Metaphysical Observations.*

*Without a Passion for Knowledge, but short Advances are made by Study and School-Learning.*

**I**N the grand *Scheme* of Creation and Propagation of animal *Beings*, there appears to be a limited, or a proportional Degree of Increase, wherein the Number of each Rank of *Beings* is suited to the *Purposes* of the *Creator*, and of one another.

The too numerous Increase of Men is prevented by *War*, *Earthquakes*, *Pestilence*, *Famine*, *Sickness*, and other Accidents in the Course of their Existence, as reduce their Redundancy to proper Bounds. And Animals are kept in a due Degree of Increase, by being the food for Men, and of one another.

Labouring Animals (*Horses*, *Oxen*, *Camels*, *Elephants*, &c.) are worn out in the Service of Man, and increase but in a certain Proportion.

The Animals ordained for Food of Mankind (*Sheep*, *Swine*, &c.) multiply very fast; but the wild and savage Animals (*Lyons*, *Tigers*, *Panthers*, &c.) encrease but very slowly. A *Lioness* seldom breeds but twice, and brings forth but One of her *Species* at a Time. Serpents and poisonous Animals (except those which are Food for others) encrease still slower; each *Species* having it's proportional *Causes* of Destruction.

*Land Fowls* and *Birds* of the Air are destroyed by Men, and destroy one another for Food, to keep the Increase of their *Species* in due Bounds.

*Fish* having a large Element to encrease in, keep their Increase in due Bounds by living upon one another. Their Destruction by Mankind for Food, or other Uses, bear no Proportion to their Destruction by one another.

Whence there appears to be a perpetual Rotation of every Animal *Species* kept alive, without too many being suffered to live at one Time. And it also appears, that animal *Beings* of all Kinds have their *Causes* of Destruction so suited to the Means of their Increase, that they may not encumber the Earth and Seas, designed for their *Theatre*, nor yet incommode one another.

Men are the only *terrestrial* *Beings*, who by their highest *Rank*, lay Claim to *Immortality*, after their Change from this Life to another: tho' all Animals, by a due Limitation of their *Sense*, *Instinct*, bodily *Powers*, and *Duration*, are made to be happy alike; served by, and serving each other.

What *Forms* of Existence other created *Beings* in the universal Space put on, or what Changes they undergo in their Duration, it is impossible for Men (in their present limited Station and Capacities) to guess at. Nor is it possible for us to conjecture (for want of Ideas) what State of Existence the *Angels*, superior and immortal *Beings* enjoy; of whose *Natures*, and *Modes* of Existence, we have not the least Glimpse of Knowledge, any more than we have *Ideas* of the infinite and supreme Creator of the *Universe*; nor yet of the glorious Things and Furniture of the Heavens that we behold with Amazement and Admiration in the boundless Expanse! especially when we consider them as the wonderful *Workmanship*, formed by Exertion of the infinite Power and Wisdom of one Creator! by him who exists every where in *infinite Space*, filled with his unspeakable and immense Perfections! Who has manifested himself throughout his *universal Creation*, from the largest to the minutest material Forms of Existence. With every Part of the *Universe* he is intimately connected, and virtually and actually present, and his infinite Power and Wisdom is evidently seen shining forth in the Formation of all *Beings*, throughout the whole Gradation and Dependencies of Things.



PALLADIUM AUTHOR.





## THE BRITISH PALLADIUM, OR

Astronomical MOONS for Greenwich Observatory. 1777.

Last Quarter.			New Moon.			First Quarter.			Full Moon.		
Mths.	d	h m	d	h m		d	h m		d	h m	
Jan.	1	9 10 A	—	9 3 40 A	—	16	0 1 A	—	23	4 20 A	
	31	6 29 A									
Feb.	—	—	—	8 4 31 M	—	14	8 19 A	—	22	9 20 M	
Mar.	2	1 43 A	—	9 3 20 A	—	16	6 12 M	—	24	2 53 M	
Apr.	1	5 30 M	—	8 0 19 M	—	14	6 1 A	—	22	7 53 A	
	30	5 17 A									
May	30	1 19 M	—	7 8 9 M	—	14	7 46 M	—	22	11 25 M	
June	28	6 39 M	—	5 3 49 A	—	12	11 3 A	—	21	1 5 M	
July	27	10 56 M	—	5 0 21 M	—	12	3 35 A	—	20	0 52 A	
Aug.	25	3 55 A	—	3 10 46 M	—	11	9 0 M	—	18	11 7 A	
Sept.	23	11 4 A	—	1 11 31 A	—	10	2 40 M	—	17	8 23 M	
Oct.	23	9 29 M	—	1 2 58 A	—	9	7 35 A	—	16	5 26 A	
				31 8 32 M							
Nov.	21	11 32 A	—	30 3 24 M	—	8	10 32 M	—	15	3 4 A	
Dec.	21	5 5 A	—	29 10 1 A	—	7	10 49 A	—	14	1 40 A	

Add to the Month-day for the Moon's Age.		Nw D	Sun's same as Moon's Place, at New Moon.		Sun enters Signs.	Sub. and add from and to D's Southing for her Rising & Setting		To find the Tide at London.	
No.	d		s o	s d		D's Place.	Arc * $\mp$	Rule.	
Jan.	20	9	9 19	10 $\infty$ 20	3 0	8 30	30 <sup>m</sup> to Time of D's Southing (from the Table of her Southing) for Time of H. Water required.		
Feb.	22	8	10 20	11 $\times$ 18	4 2	8 15	Ex. Apr. 17, 1777, D fourths by Tab follow <sup>e</sup> . 17 <sup>d</sup> 8h 43 <sup>m</sup> Add 2 30		
March	20	9	11 19	0 $\Psi$ 20	5 1	7 15			
Apr.	22	8	0 19	1 $\delta$ 20	6 0	6 15			
May	22	7	1 17	2 $\Pi$ 21	7 11	5 15			
June	24	5	2 15	3 $\odot$ 21	8 10	4 15			
July	25	5	3 13	4 $\Omega$ 22	9 0	4 0			
Aug.	26	3	4 11	5 $\mu$ 23	9 20	4 15			
Sept.	28	1	5 9	6 $\sphericalangle$ 23	10 29	5 15			
Oct.	29	1 31	6 8 7 8	7 $\mu$ 23	0 0	6 15	H.W. 11 a 13		
Nov.	30	0 30	8 9	8 $\ddagger$ 22	0 29	7 15	Add 5 30		
Dec.	0	29	9 8	9 $\nabla$ 21	1 28	8 15			

Here the Day of N. D and No. added for the following Month make up the Days in the present Month.	Exam. II. Aug. 24 Add No. 26 50 Above 29 Moon's Age 21	Req. D Pl. May 4. D's Age 26d. Past N. + 26 $\times$ 13 <sup>01</sup> / <sub>8</sub> = 11 <sup>s</sup> 12 <sup>0</sup>	18 LW 4 43 at Lond, Bridge.
Exam. Jan. N D 9, & Feb. 22 added = 31 Days in Jan.	When D's Age is above 29 or 30ds. sub. 29 or 30, as 1 & 2 cols. (agt. Mth.) make 29 or 30.	D's Pl. at } N. D May } 1 17 D's Pl. May } 4, Noon } 0 29 A near Comput. only.	N. B. Time of H. & L. W. at Lond. serve for Boats bound down and up the River, or from above and below Bridge to Lond. respectively.
To find Moon's Age. Ex. I. May 4 Add No. 22 Moon's Age 26	To find Sun's Place. Sub. or add. Degs. for Ds. bef. or aft. $\odot$ enters a Sn. for his Place Required Sun's Place for May 4th, 1777. 21 May $\odot$ Pl. 1 <sup>s</sup> . 17 <sup>o</sup> 17 Ds. & Degs. — 17 4 May, $\odot$ Pl. 1. 0 at Noon.	To find D's Rising & Setting, May 4, 1777. D mPl fr. ab. 0 <sup>s</sup> 29 <sup>o</sup> Arc*corref. $\mp$ 7 <sup>h</sup> 15 <sup>m</sup> D's So. May 4, 9m 30 D rises 4 <sup>d</sup> 2 m 15 sets 4 <sup>th</sup> 4 a 45 N. B. Always take the *Arc $\mp$ nearest or proportional to D's Place above.	Gen. Rule. Add the T. of H. W. at N. and Full D for any Place, accord. to a Tide Tab. to the T. of D's Southing that Day, for H. Water at that Place.

Here the Day of N. D. and No. added for the following Month make up the Days in the present Month.

Exam. Jan. N D 9, & Feb. 22 added = 31 Days in Jan.

To find Moon's Age.

Ex. I. May 4 Add No. 22

Moon's Age 26

Exam. II. Aug. 24 Add No. 26

50 Above 29

Moon's Age 21

When D's Age is above 29 or 30 ds. sub. 29 or 30, as 1 & 2 cols. (agt. Mth.) make 29 or 30.

To find Sun's Place.

Sub. or add. Degr. for Ds. bef. or aft.  $\odot$  enters a Sn. for his Place Required Sun's Place for May 4<sup>th</sup>, 1777. 21 May  $\odot$  Pl. 1<sup>st</sup>. 17<sup>o</sup> 17 Ds. & Degr. — 17

4 May,  $\odot$  Pl. 1. 0 at Noon.

Req. D Pl. May 4. D's Age 26 d.

Past N. + 26  $\times$  13<sup>o</sup> 1<sup>st</sup> = 11<sup>st</sup> 12<sup>o</sup>

D's Pl. at N. D May } 1 17

D's Pl. May } 0 29

4, Noon A near Comput. only.

To find D's Rising & Setting, May 4, 1777.

D m Pl fr. ab. 0<sup>st</sup> 29<sup>o</sup>

Arc\* corref.  $\mp$  7<sup>h</sup> 15<sup>m</sup>

D's So. May 4, 9 m 30

D rises 4<sup>d</sup> 2 m 15 sets 4<sup>th</sup> 4 a 45

N. B. Always take the \* Arc  $\mp$  nearest or proportional to D's Place above.

18 LW 4 43 at Lond, Bridge.

N. B. Time of H. & L. W. at Lond. serve for Boats bound down and up the River, or from above and below Bridge to Lond. respectively.

Gen. Rule. Add the T. of H. W. at N. and Full D for any Place, accord. to a Tide Tab. to the T. of D's Southing that Day, for H. Water at that Place.

\* This Computation cannot be nearer, except D's Age was given to Hours.

N. B. *The Festival marked \* is preceded by a Vigil or Fast. If any of the Fast Days fall on a Monday, the Vigil or Fast Day must be kept on the Saturday before, and not on the Sunday, which is the greatest of Festivals.*

*The Days having this Mark † against them are Holidays observed at the Exchequer, Stamp-Office, Excise-Office, Custom-House, Bank, East-India, and South-Sea House.*

*At the Custom-House there is no Holiday on Valentine, St. David, Shrove-Tuesday, Easter Wednesday, St. Swithen, Lamas-Day, Fire of London, or Holy-Rood.*

*††† The Offices are mentioned 'all but such and Such,' after †, where no Holidays are kept, when they are kept in all other Offices.*

## MEMORANDUMS for the YEAR 1777.

## JANUARY, XXXI DAYS.

- 1 Circumcision. †
- 4 Sir Isaac Newton b. 1643, N.S.
- 5 Sunday after Circumcision.
- 6 Epiphany, or Twelfth-day. †
- 8 Lucian.
- 12 1 Sunday after Epiphany.
- 13 Hilary Camb. Term begins.
- 14 Oxford Term begins.
- 15 Exchequer opens.
- 17 Old Twelfth-day.
- 18 Prisca. Q. Cha. Birth-d. kept. †
- 19 2 Sunday after Epiphany.
- 20 Fabian. 1 Return.
- 21 Agnes.
- 22 Vincent.
- 23 Hilary Term begins.
- 25 Conversion of St. Paul. †
- 26 Septuagesima Sunday.
- 27 Pr. Augustus Frederick b. 1773.
- 2 Return.
- 30 Ch. I. beheaded, 1648-9. O.S.
- 12 m past One. †

## FEBRUARY, XXXI DAYS.

- 2 Sexagesima Sunday. Pur. V.M.
- 3 Bishop Blaize. 3 Return.
- 5 Agatha.
- 9 Quinquagesima, or Shrove Sund.
- 10 4 Return. Dies Scholastica at Ox.
- 12 Ash Wednesday. Hil. T. begins
- 13 Old Candlemas-day.
- Cambridge Commencement for B. A. Day after Ash Wednesd.
- 14 Valentine. † All but Stamp, Custom, and South-sea House.
- 15 Camb. Term divides M.
- 16 1 Sunday in Lent.
- 19, 21, 22 Ember Days.
- 23 2 Sunday in Lent.
- 24 St. Matthias. \* † Pr. Adolph. Fred. born.
- 28 Hare Hunting goes out.

## MARCH, XXXI DAYS.

- 1 S. David. Anniversary Meeting of the Welch Society, who wear a Leek on this Day, in Memory of a famous Victory over the Saxons. † All but the Stamp and Custom-house.
  - 2 3 Sunday in Lent.
  - Chad B.
  - 5 Princess of Hesse born.
  - 7 Perpet. Mauriti. Mart.
  - 9 4 Sunday in Lent, or Midlent-Sun.
  - 12 Gregory Mart.
  - 13 Cambridge latter Act, Thursday after the 4th Sunday in Lent.
  - 16 5 Sunday in Lent.
  - 17 St. Patrick, Bp. of Ireland.
  - 18 Edward, K. of the W. Saxons.
  - 19 Joseph. Prs. Louisa Ann born.
  - Cambridge Term Ends.
  - 20 Cuthbert. Equal Day and Night
  - 21 Good Friday. St. Benedict.
  - Camb. Term ends.
  - 22 Oxf. T. ends. Sat. bef. Palm-S.
  - 23 6 Sunday in Lent Palm Sunday.
  - 25 Annunciation of V. Mary. \*
  - LADY-DAY, 1st Quarter-D. †
  - 27 Maunday-Thursd.
  - 28 Good Friday.
  - 30 EASTER SUNDAY.
  - 31 Easter-Monday. † Sir Is. Newton died 1727, N. S. a Miracle of the Age.
- APRIL, XXX DAYS.
- 1 Fools Day, Easter-Tuesday. †
  - 2 Easter-Wedn. † All but Cust. H.
  - 3 Richard, Bishop of Chichester.
  - 4 St. Ambrose.
  - 5 Old Lady-Day.
  - 6 1 Sund. after Easter. Low Sund.
  - 9 Oxford and Camb. Terms begin
  - Wednesday after Low Sunday.
  - 2 Sunday



- 13 2 Sunday after Easter.  
 14 1 Return.  
 16 Easter Term begins.  
 19 Alphege.  
 20 3 Sunday after Easter.  
 21 2 Return.  
 23 St. George. †  
 25 St. Mark. †  
 27 4 Sunday after Easter.  
 28 3 Return. Westminster Election  
 Day after 4 Sund after Easter.  
**MAY, XXXI DAYS.**  
 1 St. Philip and St. James. †  
 3 Inv. of the Cross.  
 4 5 Sunday after Easter. Rogation.  
 5 4 Return.  
 5, 6, 7 Rogation Days.  
 6 St. John ante Port Lat.  
 8 Ascension Day. Holy Thursd.  
 9 5 Return.  
 11 Sunday after Ascension Day.  
 12 Term ends.  
 15 Oxford Term ends.  
 18 Whit Sunday.  
 19 Whit Monday. Q. Char. b. 1744.  
 St. Dunstan. †  
 20 Whit Tuesday. † Ember Day. †  
 21 Whit Wednesday. † All but  
 Custom-House.  
 22 Princess Elizabeth born 1770.  
 32, 24 Ember Days.  
 23 Sunday.  
 26 Augustine, 1st Abp. of Cant.  
 No Night, but all Twilight.  
 27 Venerable Bede.  
 29 K. Charles II. Nat. and Rest.  
 after 12 Years Exile.  
 30 Term begins.  
**JUNE, XXX DAYS.**  
 1 1 Sunday after Trinity.  
 Nicomedes.  
 2 2 Return.  
 4 King George III. born. †  
 5 Boniface. Pr. Ernest Augustus  
 born, 1771.  
 8 2 Sunday after Trinity.  
 9 3 Return.  
 10 Princess Amelia born, 1711. †  
 All but Exch. and Custom-H.  
 11 St. Barnabas. †  
 15 3 Sunday after Trinity.  
 16 3 Return.  
 17 St. Alban.  
 18 Trinity Term ends.  
 20 Transl. of Ed. K. W. Saxons,
- 22 4 Sunday after Trinity.  
 Longest Day.  
 24 St. JOHN BAPTIST. † 2d  
 Quarter Day.  
 29 5 Sunday after Trinity.  
 St. Peter and Paul. †  
 30 Buck-hunting comes in, and  
 continues till Holy-rod. Ex-  
 eter and Wadhams Col. Elec-  
 tion at Oxford.  
**JULY, XXXI DAYS.**  
 1 Camb. Commencement for B.  
 A. 1st Tuesday in July.  
 2 Visitation of B. V. Mary.  
 3 Dies Comitiarum.  
 4 Translation of St. Martin, Ep.  
 5 Old Midsummer-day. Camb.  
 Term ends.  
 6 6 Sunday after Trinity.  
 7 Tho. à Becket, Church-tyrant.  
 13 7 Sunday after Trinity.  
 14 Oxford Act.  
 15 St. Switbin. † All but Stamp,  
 Custom, and S. Sea House.  
 19 Oxford Term ends.  
 20 8 Sunday after Trinity.  
 Margaret, Virgin and Martyr.  
 22 Mary Magdalen.  
 24 Magdalen College Election.  
 25 St. James. \*†  
 26 St. Ann, Moth. of B. V. Mary.  
 27 9 Sunday after Trinity.  
 Portsmouth Dock fired at 4 in  
 the Morning, 1770.  
 30 Dog Days begin.  
 Caricula rises with the Sun.  
**AUGUST, XXXI DAYS.**  
 1 Lammas Day. †  
 3 10 Sunday after Trinity.  
 4 Crown Point in America taken  
 by General Amherst, 1759.  
 6 Transfiguration.  
 7 Name of Jesus.  
 10 11 Sunday after Trinity.  
 St. Laurence.  
 11 Prs. of Brunf. born 1737. † All  
 but Custom and S. S. House.  
 12 Pr. of Wales born 1762. †  
 16 Pr. Fred. Ep. of Osnab. b. 1763.  
 17 12 Sunday after Trinity.  
 21 Athanasius. Pr. W. H. b. 1765.  
 24 13 Sunday after Trinity. St. Bar-  
 tholomew. †  
 28 St. Augustine.  
 29 Beheading of St. John Baptist.

- 30 Sun and Clocks together.  
 31 14 Sunday after Trinity.  
**SEPTEMBER, XXX DAYS.**  
 1 St. Giles.  
 2 London burnt, 1666, O. S.  
 7 15 Sunday after Trinity.  
 Eunuchus.  
 8 Nativity of V. Mary.  
 9 Dog Days end. Canis Major  
 rises with the Sun at 3 in the  
 Morn.  
 14 16 Sunday after Trinity.  
 Holy Cross Day. † All but  
 but Stamp, Cust. and S. S. H.  
 17 Lambert, B. Ember D.  
 18 City of Quebec surrendered to  
 General Townsend 1759.  
 K. Geo. I. & II. landed. †  
 All but Custom House.  
 19, 20 Ember Days.  
 21 17 Sunday after Trinity.  
 St. Matthew. †  
 22 K. Geo. III. & Q. Charlotte  
 crown'd 1761. † All but the  
 Cust. H. Equal Day & Night.  
 26 St. Cyprian.  
 28 18 Sunday after Trinity.  
 Sheriffs of London sworn.  
 29 St. MICHAEL, Third Quarter-  
 Day. † Hare-hunting comes  
 in, and lasts till the End of  
 February.  
 Prs. Charlotte Aug. b. 1766.

30 St. Jerome.  
**OCTOBER, XXXI DAYS.**

- 1 Remigius, Bp. of Rhemes.  
 5 19 Sunday after Trinity.  
 6 St. Faith.  
 9 St. Dennis.  
 10 Old Michaelmas Day. Oxf. &  
 Camb. Terms begin.  
 12 20 Sunday after Trinity.  
 13 Transl. of K. Edw. Conf.  
 17 Etheldred.  
 18 St. Luke.  
 29 21 Sunday after Trinity.  
 St. Frideswide, a Fest. at Court.  
 25 K. Geo. III. Acces. 1760. †  
 Crispin.  
 26 22 Sunday after Trinity.  
 K. Geo. III. proclaimed †  
 All but the Stamp, Excise,  
 Cust. and S. S. House.  
 28 St. Simon and Jude.

**NOVEMBER, XXX DAYS.**

- 1 All Saints. †  
 2 23 Sunday after Trinity.  
 All Souls. † All but Stamp,  
 Custom and South-sea House.  
 Prince Edward born, 1768.  
 3 1 Return.  
 5 Gun-powder Treason, 1605. †  
 6 Leonard. Mich. Term begins.  
 7 Duke of Cumberland b. 1745.  
 8 Princess Aug. Sophia b. 1763.  
 9 24 Sunday after Trinity.  
 Lord Mayor's Day, London. †  
 All but Exchequer.  
 11 St. Martin.  
 12 2 Return.  
 13 Britius, Bishop.  
 15 Machutus.  
 16 25 Sunday after Trinity.  
 17 Hugh, Bp. Lincoln.  
 Anniversary Q. Eliz. Procl. †  
 All but Cust. and S. S. H.  
 18 3 Return.  
 20 Edmund, King and Mart.  
 22 Cecilia, Old Martinmas-day.  
 23 26 Sund. af. Trin. St. Clement.  
 25 Catherine. D. of Gl. b. 1743.  
 4 Return.  
 27 Baliol Col. Election, Thursday  
 before St. Andrew.  
 28 Michaelmas Term ends.

30 Advent Sunday.  
 St. Andrew. Anniversary  
 Meeting of the Royal Society.  
**DECEMBER, XXXI DAYS.**

- 4 Barbary.  
 6 Nicholas.  
 7 2 Sunday in Advent.  
 8 Conception of B. V. Mary.  
 13 Lucy.  
 14 3 Sunday in Advent.  
 16 O Sapientia. Camb. T. ends.  
 17 Oxf. Term ends. Ember Day.  
 19, 20 Ember Days.  
 21 4 Sunday in Advent.  
 St. Thomas. †  
 25 CHRISTMAS DAY, 4th Quar-  
 ter-day. Fox-hunting comes  
 in and lasts till Lady-day.  
 26 St. Stephen. †  
 27 St. John the Evangelist. †  
 28 Sunday after Christmas. Holy In-  
 nocents.  
 31 Silvester, Bp. of Rome.

A TABLE of the MOON'S Southing, or Times when She passes the Meridian of Greenwich Observatory, for the Year 1777. For the Use of Seamen to find the Time of Tides, &c.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
D	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	Morn.	6m 7	4m 47	6m 9	6m 51	8m 12	8m 36	10m 14	11m 45	0a 2	0a 55	1a 6
2	6 15	6 53	5 35	7 3	7 44	9 4	9 33	11 11	0a 30	0 46	1 41	1 57
3	6 56	7 44	6 24	7 59	8 37	9 57	10 31	0a 3	1 14	1 27	2 17	2 47
4	7 39	8 34	7 17	8 54	9 30	10 52	11 29	0 56	1 56	2 9	3 15	3 38
5	8 23	9 28	8 12	9 50	10 23	11 50	0a 29	1 45	2 38	2 53	4 6	4 29
6	9 11	10 25	9 8	10 44	11 18	0a 52	1 25	2 29	3 20	3 39	4 57	5 19
7	10 1	11 23	10 6	11 39	0a 15	1 51	2 18	3 12	4 3	4 37	5 49	6 8
8	10 55	0a 20	11 3	0a 15	1 13	2 49	3 7	3 54	4 38	5 17	6 40	6 56
9	11 51	1 16	11 59	1 31	2 12	3 43	3 53	4 36	5 35	6 8	7 31	7 45
10	0a 48	2 11	0a 54	2 28	3 11	4 33	4 36	5 18	6 24	7 1	8 22	8 36
11	1 44	3 4	1 49	3 26	4 9	5 20	5 18	6 1	7 16	7 55	9 14	9 30
12	2 39	3 56	2 43	4 24	5 4	6 4	5 59	6 48	8 10	8 48	10 6	10 26
13	3 32	4 48	3 38	5 21	5 55	6 46	6 40	7 36	9 0	9 41	11 0	11 26
14	4 13	5 41	4 33	6 16	6 43	7 27	7 23	8 27	10 0	10 35	15 57	Morn
15	5 13	6 34	5 29	7 8	7 28	8 8	8 7	9 21	10 55	11 28	Morn	0 27
16	6 4	7 28	6 23	7 57	8 11	8 50	8 54	10 16	11 49	Morn	0 56	1 29
17	6 55	8 23	7 19	8 43	8 53	9 33	9 44	11 11	Morn	0 23	1 58	2 29
18	7 47	9 17	8 12	9 23	9 54	10 19	10 37	Morn	0 43	1 18	2 39	3 25
19	8 41	10 9	9 3	10 9	10 15	11 7	11 31	0 7	1 36	2 17	3 59	4 17
20	9 36	10 50	9 51	10 51	10 57	11 58	Morn	1 0	2 30	3 16	4 55	5 4
21	10 31	11 47	10 37	11 32	11 48	Morn	0 26	1 53	3 26	4 16	5 48	5 19
22	11 25	Morn	11 20	Morn	Morn	0 51	1 21	2 46	4 22	5 1	6 36	6 31
23	Morn	0 31	Morn	0 14	0 28	1 44	2 14	3 38	5 20	6 11	7 21	7 12
24	0 17	1 16	0 3	0 58	1 17	2 38	3 6	4 30	6 17	7 5	8 4	7 52
25	1 7	1 58	0 44	1 43	2 8	3 31	3 57	5 24	7 15	7 55	8 45	8 34
26	1 53	2 39	1 26	2 30	3 0	4 21	4 47	6 19	8 10	8 41	9 26	9 17
27	2 37	3 21	2 8	3 19	3 54	5 12	5 37	7 16	9 1	9 25	10 7	10 2
28	3 20	4 3	2 52	4 11	4 46	6 2	6 30	8 12	9 50	10 8	10 49	10 49
29	4 1		3 58	5 4	5 39	6 52	7 23	9 9	10 36	10 49	11 33	11 39
30	4 42		4 26	5 57	6 30	7 43	8 19	10 4	11 20	11 30	ca 19	0a 30
31	5 24		5 16		7 21		9 17	10 55		0a 12		1 22

To find the time of H. Water on any Day of the Month at any given Place, for 1777.

Gen. Rule. To the Time of the Moon's Southing (for the above Table) for that Day, add the Time of H. W. at N. or F. Moon on the given Place, (fr. Tide Table, p. 105, 106, Pal. 1765, or any other Tide Table) and the Sum abating 12, when above 12 Hours, will be Time of High Water.

Example. To find the Time of High Water at London, on Aug. 12, 1777. h m  
From the above Table the Moon souths at London, on that Day — 6 48 a  
To which add the constant Time of High Water at New and Full, at Lond. 2 30

Time of High Water, August 12, at London — — — 9 18 a  
Add for next Low Water — — — 5 48

Low Water at London, August 12, 1777, — — — 2 48 m

By Nautical Ephemeris, 1777, the Moon does not pass Greenwich Meridian September 30, nor yet October 1.

N. B. Time of H. W. serves for Boats and Vessels bound to Places below Bridge from Lond. and Time of L. W. serves for Boats and Vessels bound to Places above B. for Lond.

\* \* \* Seamen may determine the Time of H. W. at N. and F. Moon, at each Place from a Tide Table. The above Table is also of use for finding the Moon's near Time of Rising and Setting at any Place or Part, from her mean Place, and semi-diurnal Arc correspond.



# THE BRITISH PALLADIUM, OR

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TABLE of the ECLIPSES of the first SATELLITE of JUPITER, 101  
Greenwich Observatory, 1777.

For finding the Difference of Longitude of Places by Sea or Land.

January.				February.				March.				April.				May.				June.			
Immerfi.				Emerfi.				Emerfi.				Emerfi.				Fmerfi.				Emerfi.			
D	h	m	s	D	h	m	s	D	h	m	s	D	h	m	s	D	h	m	s	D	h	m	s
1	21	0	25	1	1	10	52	1	8	51	5	2	5	37	1	2	7	52	15	1	9	59	44
3	15	28	7	2	19	39	15	3	3	28	8	4	0	6	14	4	2	21	10	3	4	28	10
5	9	55	49	4	14	7	46	4	21	49	16	5	18	35	31	5	20	50	4	4	22	56	35
7	4	23	31	6	8	36	16	6	16	18	20	7	13	4	42	7	15	18	54	6	7	24	34
8	22	51	22	8	3	4	30	8	10	47	29	9	7	33	55	9	9	47	44	6	17	24	57
Emerfions				9	11	33	26	10	5	16	42	11	2	3	10	11	4	16	32	8	11	53	18
10	19	33	29	11	16	2	6	11	23	35	52	12	20	32	22	12	22	45	16	10	6	21	37
12	14	1	18	13	10	30	59	13	18	15	6	14	15	1	35	14	17	14	1	12	0	49	59
14	8	29	15	15	4	59	35	15	12	44	18	16	9	30	44	16	11	41	41	13	19	18	19
16	2	57	12	16	23	28	24	17	7	13	29	18	3	59	52	18	6	11	23	15	13	46	38
17	21	25	9	18	17	57	14	19	1	42	45	19	22	29	1	20	0	40	1	17	8	14	56
19	15	53	12	20	12	26	8	20	20	12	3	21	16	38	8	21	19	8	38	19	2	43	16
21	10	21	16	22	6	35	2	25	14	41	19	23	11	27	11	23	13	37	11	20	21	11	34
23	4	49	23	24	1	24	1	24	9	10	36	25	3	56	18	25	8	5	48	21	15	39	53
24	23	17	35	25	19	53	1	26	3	39	52	27	0	25	19	27	2	34	19	24	10	8	12
26	17	45	49	27	14	22	0	27	22	9	7	28	18	54	18	28	21	2	46	26	4	36	30
28	12	14	8					29	16	38	25	30	13	13	21	30	15	31	19				
30	6	42	31					31	11	7	43												
July.				August.				September				October.				November				December			
								Immerfi.				Immerfi.				Immerfi.				Immerfi.			
JUPITER				No Eclipse				D h m s				D h m s				D h m s				D h m s			
is now fo				of any of				1	8	30	54	1	10	45	34	2	7	22	57	2	9	19	17
near the				Jupiter's				3	2	59	58	3	5	14	36	4	1	51	23	4	3	46	57
Sun, that				Satellites				4	21	29	6	4	23	43	35	5	20	19	40	5	22	14	35
neither				can be				6	15	58	14	6	18	12	33	7	14	47	58	7	16	42	8
the eclipses				seen this				8	10	27	21	8	12	41	28	9	9	16	10	9	11	11	9
of his first				Month,				10	4	56	26	10	7	10	24	11	3	44	25	11	5	37	20
nor any				through				11	23	26	33	12	1	39	15	12	22	12	31	13	0	4	55
other Sate-				the Vici-				13	17	54	41	13	20	8	6	14	16	40	41	14	18	52	24
llellite can				nity of				15	12	23	50	15	14	26	56	16	11	8	39	16	11	59	59
be seen				Jupiter to				17	6	52	58	17	9	5	45	18	5	36	42	18	7	27	25
this				the Sun.				19	1	22	2	19	3	34	29	20	0	4	45	20	1	54	57
Month.								20	19	51	10	20	22	3	10	21	18	32	36	21	20	21	29
								22	14	20	16	22	16	31	50	23	13	0	9	23	14	49	57
								24	8	49	23	24	11	0	27	25	7	28	21	25	9	17	3
								26	3	18	24	26	5	29	0	27	1	56	6	27	3	45	0
								27	21	47	30	27	23	57	38	28	20	23	52	28	22	12	28
								29	16	16	33	29	18	26	5	30	14	51	36	30	16	40	4
								31	12	54	36												

To find the Difference of Longitude from Greenwich Observatory.

Rule. The Difference of Time between any Eclipse of Jupiter's First Satellite, at Greenwich, happening as above, and the Time the same Eclipse is observed to happen, under a distant Meridian, being turned into degrees, at Sea or Land, will be the Difference of Longitude between Greenwich and the Place of Observation.

Example. Eclipse of the First Satellite of Jupiter at Greenw. Ap. 16, 9 30 44  
The same Eclipse being observed at Sea, or a distant Port, sooner 16, 9 27 13  
Multiplying h. m. s. in Time by 15 for D. M. S. Diff. Long. the  
Diff. Long. to the west of Greenw. is 135° 52' 55" req. Diff. sooner 9 3 31

N. B The later Time is East, sooner Time is West-Longitude.

THE BRITISH PALLADIUM, OR  
FIVE ECLIPSES IN THE YEAR 1777:

Three of the SUN, and Two of the MOON.

I. Of the *Sun*, on *Tbursday, Jan. 9*, in Part visible.

According to Nevil Maskelyne  
of Greenwich.

According to Thomas Cooper of  
Wellingborough.

	h	m			h	m	s		At <i>St. Mary's</i> ,				
Beginning	-	3	49	at <i>Greenwich</i> ,	Beginning	3	49	42	One of the				
Conjunction	-	3	39					at <i>London</i> ,	<i>Azores Islands</i> ,				
in 9 <sup>s</sup> 19° 51' D's				} Nautical Ephemeris.					h	m	s		
Lat. 0° 40' $\frac{1}{2}$ S.									Beg.	1	55	4	
Sun sets	-	-	4	2					Vif.	6	3	18	12
					Dig. ecl.	2 <sup>d</sup>	13'		Mid.	3	18	19	
					At ☉ Set.	4	2	31	End.	4	32	6	
									Dig. ecl.	11°	37'		

N. B. This will be a great Eclipse, not quite total, but annular in the Atlantic Ocean. The luminous Ring environing the Moon's dark Body, where central, will be One-tenth of a Digit.

Thomas Corupe.

II. Of the *Moon*, on *Thursday, Jan. 23*, in Part visible.

	h	m	s		h	m		Dig. Tim.
Beginning	2	47	20	} Nautical Ephem.	Beg. -	2	47	ec. h m s
Middle	4	11	40		Mid. -	4	9	6 4 37 40
Moon rises	4	25			risef 6 dig. $\frac{3}{4}$ eclip.			5 4 51 0
Ending	5	36			Ecl. 8 4 17			4 5 36 24
Digits ecl.	7°	6'			Ending 5 31			3 5 10 16
III. Of the Sun, on Thurs. July 4,					Apparent Time Wel-			2 5 18 40
invisible.					lingborough.			1 5 26 19
	h	m						End 5 33 33
Conjunction - -	12	21			Conjunction	12 <sup>h</sup>	24 <sup>m</sup>	at London.

In  $3^{\circ} 13' 11''$  S. Lat.  $26^{\circ} \frac{1}{2}$  S. }  
*Centrally eclipsed* } 12 26  
 on the Merid. }  
 In Lat.  $3^{\circ} 48' \frac{1}{2}$  S. and Long. }  
 $173^{\circ} 37'$  E. of Greenwich. } aut. Ephem.

without respect to T. C.  
 Merid. of Lond.  
 At *Otaçbite* (Lat.  $17^{\circ} 30'$ . Long.  
 $149^{\circ} \frac{1}{2}$  E.) II. Eclipse will happen, as  
 follows :

IV. Of the <i>Moon</i> , July 20, <i>invisible</i> .			h	m	s	
	h	m	s	Beg. - -	7 53	4
Begin.	0	5	0	Middle	9 11	} <i>Saturd. 5 July in the Morn.</i>
Middle -	0	41	40	Vis. ☉	9 15	
End - -	1	18	20	End - -	10 43	
Digits ecl.	1 <sup>8</sup>	15'		Digs. ecl.	9° 59	

V Of the Moon, *Mond. Dec. 29, invif.* In *New Guinea* (Lat.  $12^{\circ}$  S. Long.  $140^{\circ}$  E.) the II. will happen thus :

Conjunction - - 9 59 30	} Naut. Eph.	h m	} Apparent Time
In 9s 8° 39' D's L. 0° 30' N		Beg. - - 7 10 $\frac{1}{2}$	
Centrally eclipsed in Merid. in		Vif. ♂ - 8 18 $\frac{1}{2}$	
Latitude - - 22° 41' S		Middle - 8 26 $\frac{1}{2}$	
Long. at Greenwich 149° 54' W		End - - 9 16	
Observation.		Digits ecl. 11° 15'	} Morn.

The *Nautical Ephemeris* is for 1776  
 omitted or missed an invisible Eclipse  
 of the Sun, on Jan. 20.  $\odot$  at  $14^h$   
 $37^m$  in  $10^s 0^o 44^m$ .  $\odot$ 's Lat.  $14^{\circ} 21' N$   
 Long.  $174^{\circ} 45' E$ . the Sun will be totally eclipsed 10 Minutes past Noon,  
 at which Place the Continuance of total Darknefs will be above 3 Months,

# ANNUAL MISCELLANY, 1777. 11

when some of the *Planets* will be visible to the naked Eye (if the Air be serene) viz. *Jupiter* about  $18^{\circ}$  to the Right, or Eastward, *Venus*  $38^{\circ}$ , and *Mercury* 16 to the Left or Westward of the Sun.

Ellington, near Huntingdon,

T. Cowper.

Tuesday, Apr. 2, 1776.

We are sorry we cannot find Room for this ingenious Correspondent's *Types* of the correct Appearances of these several *Eclipses*, in the different Places for which he has elaborately computed them; but we have inserted this Year all we can for the Advancement of his Honour and Improvement of *Astronomical Science*.

Besides the *Eclipses* of the great *Luminaries*, he observes, that the *Moon* makes some near *Appulses* to the Planet *Venus*, and that, at the Time of their Conjunction, on Wednesday 2d July 1777, after Sun-rise, there will be an *Occultation*, which (notwithstanding it happens after Day-light here) will be very conspicuous through a small *Telescope*, and even to the naked Eye, if the Morning proves favourable.

An OCCULTATION of VENUS by the MOON, 2d July in the Morning 1777, will happen according to the following Computation.

	London.			Wellington.			St. John's			
	h	m	s	h	m	s	h	m	s	
Beginning, or 1st Contact	6	4	34	6	3	9	2	37	4	
Central Ingress — — —	6	5	18	6	3	57	2	38	2	Note, At St. John's
Immersion — — —	6	6	10	6	4	45	2	39	3	Newfoundland, the
Visible Conjunction — —	6	38	7	6	35	56	2	51	13	Occultation will be-
Middle of Occultation —	6	38	34	6	36	39	2	54	7	gin soon after the
Emergence — — —	7	10	58	7	9	31	3	9	29	Moon and Venus
Central Egress — — —	7	11	50	7	10	19	3	10	29	rise, and end before
End, or last Contact —	7	12	34	7	11	6	3	11	39	Sun rises.
Total Obscuration — —	1	4	43	1	4	46	—	30	26	
Central Duration — — —	1	6	32	1	6	22	—	32	27	
Whole Duration — — —	1	8	0	1	7	57	—	34	29	

N. B. The visible Way of the *Moon* from *Venus*, at *St. John's*, will be nearly in a *Right Line*, in passing from her Right to her Left Limb, nearly under the Middle of her Disk, where *Venus* first enters and last emerges. But at *London*, *Venus* passes in a curve *Convex* towards the *Moon's* Center under the Top of her Disk.

The *Moon* likewise makes another *Appulse* to *Venus* (our Correspondent observes) on Sunday 28th Decem. 1777, between 6 and 7 in the Morning. But the nearest Approach happens before their Rising; yet it may not be an unpleasant Phenomenon to see the *Moon* accompany *Venus*, so nearly, for some time before and after Sun-rise.

Our Correspondent's Six *Types*, for which we want Room, are of a curious Construction, accurately shewing the Curve Passages of the *Luminaries* they represent. These 6 *Types* consist of 12 circular Figures, each broader than a Shilling; besides a very large round Section of the *Earth's* Shadow, through which the *Moon* passes, that would do Honour to the Calculations and Calculator, had our Work been larger and admitted of Room to introduce them.

This ingenious Correspondent has likewise obliged us with accurate Computations of the Sun's Place, Right Ascension, and Declination, for each Day at Noon, of the Year 1777; but our Plan being confined to a Variety of more general Subjects, we cannot do them the Honour they deserve.



## REMARK.

Unlike this able Correspondent, in *astronomical* Computations, we have had, sent abroad, *Observers* of the *Transit* of *Venus* over the *Sun's Disk*, without their bringing home the *Requisites* of Observation for solving the *important Problem* of the *Sun's Parallax*, as directed by that great *Astronomer* and *Mathematician* *Dr. Halley*; but, by their Neglect to take the *Requisites* of Observation, for which they were sent, they appear to be so little acquainted with their Utility in the Solution of the said *Parallax Problem*, that they seem to have done nothing towards the Accomplishment of that *arduous Task*, by not applying, or not being able to apply, any of their Observations taken, for the Use intended; nor brought home sufficient *Data*, for the ablest *Mathematicians* to determine the *Sun's Parallax* by. Who might as well have observed the Motion of the *Clouds* and their *Velocities* only, in the Places they visited, for performing the Business for which they were sent, as not duly applying their Observations. So that the *Philos Transf.* containing their Observations, unapplied, are filled with a Redundancy of useless Materials and Rubbish.

## PALLADIUM AUTHOR.

That our Word may be the less doubted, we give the following *Extract* of a Letter on this Subject, that we have lately received from a First Rate *Mathematician*, of *undoubted Abilities*.

## TO THE PALLADIUM AUTHOR.

"I cannot but wonder at the *Stupidity* of those who have been sent to make *Observations* on the *Transit* of *Venus*, that they did not understand the *necessary Data*. *Dr. Halley's*, and every Method requires the *Length of Time* of the *Transit* to be given; and that is only known by having the *Time of Beginning and Ending*. And as necessary it is to have the *Space described*, or *Length of the Chord*, which can only be known by having the *greatest Depth* of *Venus* in the *Sun's Disk*. It is true, if any *Depth* be given at a given *Time*, the *greatest Depth* may be computed, but not exact enough; as in that of *W. and D.* It is certain the *Parallax* cannot be determined from any Thing you mention of their *Observations*; and therefore I wonder that *M—e*, or rather *M—y—r*, should have the *Assurance* to say, that the *Sun's Parallax* has been determined to be  $1\frac{1}{2}$  Seconds less by *Observations* of the *English* at the *Cape of Good Hope* than by the *French* before, in his *Preface*; or in *Parts 61, or 114*, when he makes it  $8''.83$ , and *De La Caille* had made it  $10''.3$ ; this is certainly working without *Data*. Let any of them demonstrate upon what Principles the *Sun's Parallax* can be found by having no more *Data* than the *Second internal Contact* of *Venus* with the *Sun's Limb*, observed at the *Cape of Good Hope* 1761, compared with the *Observations* at *Greenwich* at the same time. I think one may challenge all the World, or even defy them, to prove it.

May 8th, 1776.

## TRUTH."

P. S. "Our wise *Astronomers*, that observed at *Greenwich*, might as well have taken the *greatest Depth* of *Venus*; but I cannot find they have done any thing to the present Purpose. I have no Manner of Notion what they are going to do with their *Pendulums* in the Mountains of *Scotland*. Is there any thing printed about it?"

Yes, A printed Eulogium of the immortal Honours acquired by the principal *Pendulum Conductor* (the other, with his miscondacted *Pendulum* having escaped Notice) who has been presented with a *Gold Medal*, impressed with Devices of his Honours, for accurately determining to  $5''.8$  the Deviation of his successful *Pendulum* from a *Perpendicular*, by the Attraction of the *Caledonian Mountains*! *De La Lande*, of *France*, long before determined this Mountain-Attraction of a *Pendulum* about  $8''$ . *M. Bouguer* determined it to  $7''\frac{1}{2}$ . But *Mr. Maskelyne* has discovered the *Earth's Density* to be twice that of his Mountain, *Schellien*, by his greater Accuracy.

## REMARK.

If the *Rector* of the *Great Tythes of Longitude*, and his dependent *Vicars of the Smaller Ones*, would, between them, condescend to solve the *Problem of the Sun's Parallax*, from the *Observations of the Transit of Venus* (given in the *Philosophical Transactions*, Vol. 1769) it would convince us, and the Public, of their *Worthiness* to hold the consolidated and separate *Emoluments of Longitude Profits* bestowed on them by a certain *Honourable Board*. But no *Solution of the Sun's Parallax* being given in the said *Transactions*, from the said *Transit-Observations* (the only Use to which they could be applied) we are led not only to *doubt* of the *Observers* being real *Astronomers*, but whether the *Conductor of the Transactions* be a real *Mathematician*.—PALL. SECRETARY.

## Astronomical ANECDOTE.

By Men making a Number of diligent and successive *Observations of the Motions and Properties of the Luminaries* for Ages past, they came to foretell *solar and lunar Eclipses*, to an Accuracy, many Years before they happened; raising the *Astonishment of Mankind* when they appeared at the Time and in the Manner predicted. So likewise, if Men made the like successive and diligent *Observations on the Course of Providence*, in the Succession of important *Events* happening to Mankind, they would, probably, lead to the *forejudging and foretelling*, by similar *Causes and Effects*, other *Events of Providence*, as *Lessons of Instruction to Mankind*, in the *Changes of human Affairs*, happening in the same, and in different States and Governments.

From a Series of *Observations* diligently made, the *Times of Comets* returning in their several immense *Orbits* have likewise been predicted (one at the Distance of 85 and another in 500 Years) as the *Revolutions or Periods of the planetary Bodies* in our System came to be discovered; and the *Duration and perishable Periods of the Planets*, like those of Men and Animals, from *Observation* may come to be known. The *Duration of the Globe of our Earth* has been attempted by the Number of *Lava from Vesuvius at Mount Ætna*; viz. 14, dug up in different *Strata* buried in the Earth; each *Lava* requiring 1000 Years, from *Observation*. So by *Causes of Events* observed, the *Revolution or Changes of human Affairs* may be prejudged of.

Hence the *approximate Time* may be calculated, when the *Longitude* will be *duly discovered* by our great *Discoverers*, from the *Rules of our political Arithmetic*, determining the Number of *Inhabitants*, approximately, upon the Face of the *whole Earth*, or in any particular Country.

OEDIPUS.

## INTRODUCTION to GEOGRAPHY continued.

THE HONOURABLE DAINES BARRINGTON having published a late *Essay on the Probability of Navigators reaching the Pole*, with a *First and Second Supplement* thereto, sold by C. Heydinger, in the Strand, London, printed 1775-6, increasing the *Probability*, by containing numerous *Instances*, vouched by undoubted Authorities, of several Dutch and other Masters of Ships having differently approached to very high *northern Latitudes*, giving also an Account from Facts, of the different Kinds of *Ice* generated, *Salt and Fresh*, with the Manner of their Production, in these remote *northern Seas*, we cannot but look upon these interesting Relations by that Gentleman, united with the Discoveries of the *indefatigable and enterprizing Capt. Cook*, in his two late Voyages round the Globe, in remote southern Latitudes, as the *greatest Improvements*

Improvements in *Geography* this Age has afforded. And as we find by the several Accounts mentioned, that *further Advances* towards the *North Pole* have been *actually* made, than in our Voyage, in early Life, to the remotest Parts of *Spitsbergen* we ever conceived possible to *approach*, (the *Formation* of the different Kinds of Ice being ascertained by the said Author, from *curious* and *certain* Experiments he made in the last *hard Frost*, 1776); we are therefore obliged in Justice and Honour to his Discoveries, to alter our Sentiments from what they were in our last Year's *Palladium*, with regard to the *Impossibility* we conceived of approaching the *North Pole* (on Account of our having supposed the Sea to be frozen over, and continually covered with Ice, from Lat. 83 or 84 to 90 Degrees) to *acquiesce* with this Gentleman's high Degree of *Probability*, or rather *demonstrative Truth*.

The Hon. Daines Barrington has shewn, by several Instances he has quoted, that the *Barricado* or *Blockade* of Ice brought together by Currents, from the *Bays* and *Reservoirs* of Land-water of the *Tartarian* Shores, and driven to the *westward*, reaches no further than 83 or 84 Degrees of N. Latitude. That those *Fields*, *Banks*, and *Blockades* of Ice, are found *chiefly* at certain Seasons of the Year assembled together, after being severed and driven from their Places of Formation, by Winds and Currents to the *Westward*. That beyond the N. Lat. of 84 Deg. he makes it appear that the Sea is quite *open* as far as and beyond the *Pole*. So that we gather, if a Ship arrive in the *Greenland* or *Spitsbergen* Seas early in the Spring, about the Middle or End of *March*, before the said Ice is separated and accumulated, it is *probable* that she may advance safely in an open Sea to, and beyond the *Pole*, to the *N. American* or *Japan* Shores, as far on the contrary Side without Interruption: or passing thro' an *Interval* of the Ice in a favourable Season (and some happen more favourable than others) when the floating Ice is collected; in *May*, it is supposed that a *Passage* may be gained to the *Pole*, and beyond it, as far on the *contrary* Side, without any *Interruption*. Nevertheless there may be Danger of being inclosed with Ice, at the Hazard of losing the Ship and Lives on Board, if due *Precaution* is not taken in attempting the *Passage* through the Ice, on this Side the Lat. 84 Deg. In getting the Ship beyond the *Barricado*, or *Banks* of Ice on this Side 84 Deg. Lat. it may be hazardous to return back again, if the Attempt is not made early, before the vast Collection of floating Ice takes place to the *Westward* of the *Tartary* Shores.

To confirm the Hon. D. Barrington's *curious* and *useful Discoveries*, we have got certain Information of a *Passage* having been *actually* made, by an enterprising *Portuguese*, David Melguer, Master of a Ship called *The Eternal Father*, who set out from *Japan*, on the 14th of *March*, 1660, and running along the Coast of *Tartary* as far as Lat. 84. steered by the N. Pole, over the *Arctic* Sea, and then between *Spitsbergen* and *Greenland*; and, passing by the West of *Scotland* and *Ireland*, returned safe to *Portugal*.

The Particulars of which *Arctic* or *North Sea*, (called The ICE SEA) and its Coasts, with an Account of the several Straits leading thereto, thro' which Passages between *Europe* and *Asia* have been made, and the *Incidents* happening to the Masters of Ships, who have navigated those Regions, will be laid before the Public as soon as the full *authentic* Accounts can be procured and collected by the *honourable Author* aforelaid.

The *Parliamentary* Reward of 5000*l.* lately procured by the Hon. Daines Barrington, to any Person who shall penetrate beyond 89 Deg. N. Lat. shews that the Author's Zeal for the Promotion of *Geography* in the useful Discoveries made for the Honour and Advantage of the *British Nation*, not to be less than the *Arour* of attempting the Discovery. And the further *Parliamentary* Reward of 20,000*l.* procured by the same Gentleman, to any Person who shall  
fail



fail in any Direction from the N. Sea, through a Northern Passage to the South Sea, or *Pacific Ocean*, shews his further Zeal for *useful Discoveries*; which can only be equalled by the enterprizing Ardour of Capt. *Cook*, to whom no Difficulty appears insuperable; and by whom, we hope, a just Claim of one or both Rewards, will be made for one or both those meritorious Discoveries.

PALLADIUM AUTHOR.

General GEOGRAPHICAL DEFINITIONS, and DIVISIONS of our whole *Terraqueous GLOBE*.

		T	E	R	M	S.
Cosmography	Description of	World	Polygarchy	Governm. by	Many.	
Geography		Earth	Theocracy		God Himself.	
Chronography		Countries	Monarchy		One alone.	
Topography		Places	Aristocracy		Nobles & Peers.	
Hydrography		Water	Democracy		People.	
Astronomy		Stars	Oligarchy		Few Nobles.	
Chronology, Account of Time.			Republic, Common Wealth.			
Northern	Hemispheres	Half of the Globe	from Equator to	{ N } Pole.	{ S }	
Southern						
Latitude, Deg. fr. Equator, N. or S.		Longitude, Deg. fr. Mer. W. or E.				
Meridian, Circle surrounds the Earth, through both Poles.						
Equator, Circle surrounds the mid. of the Earth, fr. E. to W. or W. to E. (bet. both Poles) on which the Deg. of Long. are measured. All the Meridians meet in both Poles.						

N. B. For the better Explanation of the Parts of the *terraqueous Globe*, and also of the Circles and Properties of the Heavens correspondent, we shall give the *Definitions* of the artificial *terrestrial*, and also *celestial GLOBE*, tabularly methodized hereafter. But First,

The General DIVISION of LAND into PARTS.

CONTINENTS, or } Large Tracts of Land containing many Countries, not  
TERRA FIRMA } separated by Water, as *France, Spain, Germ. Russia, &c.*

ISLANDS } Parts of } on every side, as } *England, Ireland, Borneo, Japan, &c.*

PENINSULAS } Land sur- } except at an Isth- } *Jutland, Morea, Malacca, E. Indies, &c.*

ISTHMUSES.—Narrow Necks of Land joining Peninsulas to Continents, as  
Isthmus } Suez joins Asia to Africa. } Isthmus } Darien j. N. to S. America.  
of } Corinth j. Morea to Greece } of } Malacca j. Indo to Indies.

PROMONTORIES OR CAPES—High Parts of Land shooting far into the Sea, as

Cape	North, Sudermania.	Cape	Good Hope, Cafraria.
	Finisterre, Galicia.		Comorin, East Indies.
	Vincent, Algarve.		Florida, Florida.
	Verd, Cape Verd Isle.		Horn, Ter. Del. Fuego Isle.

COASTS OR SHORES—Parts of a Country bordering on the Seas.

MOUNTAINS—Rising Parts of Land over adjacent Countries, as

Dofrine between Norway & Sweden	Lybian	—Zara and Egypt.
Riphæan—Russia and Siberia.	Atlas	—Barbary & Biledulgerid
Carpathian—Poland and Hungary.	Moon	—Ethiopia & Monamugi
Pyrenean—France and Spain.	Apalachian—	Carolina and Louisiana
Alps—Italy and Germany.	Vesuvius	{ Volcanes in }
Appenine—Tuscany and Popedom.	Ætna	
Taurus—Caramania	Hecla	{ Sicily.
Caucasus—Tartary	Peake of Derby	{ Iceland.
Nagracut—Tibet	Plinlimmon	—Eng and Wales.

Grampion

Grampian } — Scotland.	Lebanon — Palestine.
Teviot —	Pico of Tenerif — Canaries.
Ararat, near Caspian Sea.	Andes, or Cordilleras South America.
Horeb and Sinai Arabia.	N.B. The 2 last the biggest in the World.

The General DEFINITIONS of WATER into PARTS.

OCEANS large } Collections of Salt Water separating Land ; as  
SEAS less }

## OCEANS.

Northern or Frozen	Lies between	N.	Parts of	Europe, Asia, and	} America
Atlantic — Western		E.		Europe, Afr. & W. of	
Pacific — Southern		N.W.		America, and N.E.	
Indian — Eastern		E.		Africa, and South	

## SEAS.

Baltic betw. Germ. & Sweden	Atlantic Ocean	Adriatic bet. Italy	} Mediter. Sea.
Cattegat — Sweden & Denmark		Archipel. — Greece	
German — G. Brit. & Ireland		Euxine — Crimea	
St. Geo } — G. Brit. & France		Levant — Syria	
English } —		Marmora — Roman.	
Irish — G. Brit. & Ireland		Red — Arab & Nub. Ind. Oc.	
Mediterran. — Europe and Africa		White, lies N. of Russ. Froz. Oc.	
Ethiopian, on the Guinea Coast.		Caspian, — In Russian Tartary	

GULPHS, or } Parts of the Ocean or Sea surrounded by Land except where  
BAYS. } they communicate with the Main ; as

Biscay Bay	Coasts of	France and Spain	Branch of the	} Atlantic Ocean.
St. Lawrence		Nov. Scotia and New Britain		
Fundy Bay		New Scotland		
Mexico		Florida and Mexico		
Finland		Sweden and Russia		} Baltic Sea.
Bothnic		East Indies		
Bengal		Persian Arabia		} Indian Ocean.
Ormus		California		
Persian	} Coasts of	New Britain and Wales	} Branch of the	} South Sea.
California				
Hudson's Bay	} Coasts of		} Branch of the	} Frozen Ocean.

LAKES—Collections of Water entirely surrounded by Land ; as

Lomond in Scotland.	Asphaltis — Palestine.
Neagh — Ireland.	Elbuciana — Egypt.
Ladoga — Sweden.	Borneo — Negroland.
Onega — Russia.	Aquilunda — Ethiopia.
Constance — Germany.	Nicaragua } — Mexico.
Geneva } — Switzerland	Mexico }
Lucern } —	Ontario }
Corus — Tartary.	Erie } — Canada.
Chiamy — India.	Superior }

STREIGHTS—Narrow Passages of Water joining one Sea to another ; as,

DoverStreights	joins the	German Sea and English Channel.
Gibraltar		Mediterranean and Atlantic.
Babelmandel		Red Sea and Eastern Ocean.
Ormus		Persian Gulph and Southern Ocean.
Sound		Cattegat and Baltic Sea.
Magellani		Eastern and Western Ocean.
Malacca, between Malacca and Sumatra,		Eastern Ocean.

RIVERS

RIVERS—Streams of Fresh Water flowing from Mountains and Springs; as,

Thames	in England.	Ebro	in Spain & Portugal	Yellow	in China.
Severn		Guadalquiv		Tay	
Humber		ver		Nile	Egypt.
Forth		Douro		Niger	Negroland
Say	in Scotland.	Tagus	Italy.	Gambia	Louisiana
Tweed		Guadiana		Senegal	
Shannon	Ireland.	Tiber	Russia.	Mississippi	Canada.
Boyne		Po		Ohio	
Barrow	Germany.	Adige	in Arabia and Persia	St. Lawrence	Mexico.
Danube		Don		North Plata	
Rhine	Poland.	Walga	Tartary.	Oroonoko	Paraguay
Elb		Dwina		Amazon	
Vistula	France.	Tigris	India.	the largest River in the World	Ter.Firma
Nieper		Euphrates			
Niefter		Oxus			
Seine		Tobol			
Rhone		Oby			
Garonne		Indus			
Loire		Ganges			

CLIMATES—Circular Spaces, lying East and West round the terraqueous Globe, of a certain Breadth, between certain Degrees and Minutes of North or South Latitudes; the Places lying within their Limits differing just half an Hour in the longest Day from one another, according to the following

TABLE of different CLIMATES. COMPASS, or HORIZON, divided into 32 Points, Winds, or Rhumbs, each Point =  $11\frac{1}{4}^\circ$ , that is,

$32 \times 11\frac{1}{4} = 360^\circ$  the whole Circumference.

Deg. Diff. L.  $\frac{1}{2}$  { Dist. of Count. } E. later { fr. } Noon

Hor. Diff. L.  $\frac{1}{2}$  { Diff. of Time. } W. soon { 12 } Midn.

CLIM.	Latit.	Bread.	Longest D.	H. M.		H. M.	D. M.
D M	D M						
1	8. 25	8. 25	12. 33		Great Britain	Noon	12. 0
2	16. 25	8. 0	13. 0		France and Negroland	Af. 0. 15	3. 45 E.
3	23. 50	7. 25	13. 30		Italy, Germany, and Sweden	1. 0	15. 0 E.
4	30. 25	6. 30	14. 0		Turkey in Egypt	2. 0	30. 0 E.
5	36. 28	6. 8	14. 30		Arabia and Russia	3. 0	45. 0 E.
6	41. 22	4. 54	15. 0		Persia and Indian Sea	4. 0	60. 0 E.
7	45. 29	4. 7	15. 30		Bombay and Mogul	5. 0	75. 0 E.
8	49. 1	3. 32	16. 0		Bengal and Tartary	6. 0	90. 0 E.
9	51. 58	2. 57	16. 30		China and Sunda Isles	7. 0	105. 0 E.
10	54. 27	2. 29	17. 0		Phillippa and Banda Isle	8. 0	120. 0 E.
11	56. 37	2. 10	17. 30		Japan and New Guinea	9. 0	135. 0 E.
12	58. 29	1. 52	18. 0		Unknown Land	10. 0	150. 0 E.
13	59. 58	1. 29	18. 30		Great South Sea	11. 0	165. 0 E.
14	61. 18	1. 20	19. 0		New Zealand	Midnight	12. 0
15	62. 25	1. 7	19. 30		Great South Sea	Morn.	1. 0
16	63. 22	0. 57	20. 0		Otabeite	2. 0	15. 0 W.
17	64. 5	0. 44	20. 30		Great South Sea	3. 0	30. 0 W.
18	64. 49	0. 43	21. 0		California	4. 0	45. 0 W.
19	65. 21	0. 32	21. 30		Mexico or New Spain	5. 0	60. 0 W.
20	65. 47	0. 22	22. 0		Florida and Canada	6. 0	75. 0 W.
21	66. 6	0. 19	22. 30		Virginia and Peru	7. 0	90. 0 W.
22	66. 20	0. 14	23. 0		Caribbe Isles	8. 0	105. 0 W.
23	66. 28	0. 8	23. 30		Greenland	9. 0	120. 0 W.
24	66. 31	0. 3	24. 0		Azores Isles	10. 0	135. 0 W.
25	67. 21		1 Month		Canary Isles and Iceland	11. 0	150. 0 W.
26	69. 48	2. 27	2 Months		Spain and Morocco	11. 45	176. 25 W.
27	73. 37	3. 49	3 Months				
28	78. 30	4. 53	4 Months				
29	84. 5	5. 35	5 Months				
30	90	5. 55	6 Months				

The SUN is exactly on the Meridian of any Place, or exactly south when it is 12 at Noon there, consequently as he continually and apparently moves





*Port*, a Harbour-place where Ships arrive.  
*Precipice*, a steep Descent.  
*Promontory*, high Land stretching into the Sea.  
*Region*, a large Tract of Land.

*Shelves*, Rocks and Sand under Water  
*Spring*, a current of Water fr. the Earth  
*Strand*, the Sandy Coast over which the Sea ebbs and flows.  
*Whirlpool*, where the Water turns round and descends.

### PROPERTIES of the EARTH.

1. THE Figure of the Earth, composed of Land and Water, is nearly a Globe. This is proved by the Sailing of a Ship round it, and by the Body of the Ship (called the *Hull*) gradually disappearing before the Masts and Rigging, in sailing at a distance; and by the Ship's Rigging and Masts gradually appearing before the Body, when a Ship sails out of the Ocean.
2. *Eclipses* happening sooner, than with us, to the *West*, and later to the *East*, in Longitude, is another Proof of the Earth's Roundness.
3. All high Lands, Towers, and Castles lowering their Heights, and gradually disappearing in sailing from them, is another Proof of the Earth's round Figure.
4. The Earth's *Shadow* on the Moon's *Disk*, in a *lunar Eclipse*, always appearing circular is another Proof.
5. The very Sailing round the *Globe*, continually *westerly*, and returning to the same Place departed from, is an undeniable Proof; since nothing but a round Figure of the Earth could admit of it.
6. From the Roundness of our Earth, composed of Land and Water, it is called the *terracuous Globe*. The Hills and Vallies bear so little Proportion to the Bulk of the whole Earth, as not to hinder it's Roundness, any more than the Inequalities and Sands on the Surface of a Bowling-green Bowl, hinder its Rotundity.
7. The Latitude of any Place on the Earth's Surface is equal to the Pole's Height above the Horizon.
8. Hence the Height of the *Equinoctial* above the Horizon is always equal to the Complement of the Earth's Latitude to  $90^{\circ}$ .
9. The Motion of all Bodies descending to the Earth in any Place, is in a Direction perpendicular to the Earth's Surface, or Plane of the Horizon.
10. Therefore, if a Body be suspended by a String, the String will hang in a perpendicular Direction to the Earth's Surface, or Horizon.
11. In the *terracuous Globe* there is, probably, more solid Earth than Water, and more superficial Water than Earth. This is concluded from the Motion of Tides, near the Surface, and the rapid Running of Currents.
12. The Dispersion of the Islands over the Surfaces of Seas infer the Seas to be of no great Depth. Whence some have concluded the Depth of Seas to correspond with the Height of Mountains.
13. The correct Figure of the Earth, declining a little from a Globe, is proved to be similar to a Bowling-green Bowl, a little flatted next the Poles; it's different Parts are supposed to have different Densities.
14. The Gravitation towards the Earth increases going from the Equator to either Pole; because of the greater Nearness to the Earth's Centre. It is every where as the Square of the Cosine of Latitude.
15. The Rotation of the Earth round its Axis accounts for it's swelling out, or protuberating next the Equator, between both Poles.

16. Sir Isaac Newton, from the Principles of Gravity, calculated the Difference of the Polar and Equatorial Semidiameters to be  $\frac{1}{230}$ . The Polar and Equatorial Axes from hence are found to be a Mean of the differently computed Diameters; or of those taken from several Experiments by measuring the different Lengths of a Degree on the Meridians of the Earth's Surface.

17. Attraction of large Mountains of a Plumb-line from a Perpendicular is long ago found to be not less than 7 or 8 Seconds of a Degree.

18. Greater and lesser Density of the Earth, in different Parts, will have a similar Effect. The Earth being denser towards the Equator, or denser towards the Poles, will have a variable Effect on suspended Bodies.

19. The Length of a Pendulum vibrating Seconds increases from the Equator to the Pole, because of the greater Nearness to the Earth's Centre, as the Force of Gravity increases in the Square of the Cosine of Latitude.

20. Hence the Length of a Pendulum at the Equator is to one at the Pole, as the Polar Axis is to the Equator's Diameter.

21. A Pendulum's different Length in different Latitudes, vibrating Seconds, tends to prove the Earth to be higher at the Equator than at the Poles. Here follows

A TABLE of the different Lengths of a Pendulum betwixt the Equator and Pole, vibrating Seconds.

Deg.	In a Degree	Pendul Length
	Miles.	Inches.
0	68.723	39.027
5	68.730	39.029
10	68.750	39.032
15	68.783	39.036
20	68.840	39.044
25	68.882	39.057
30	68.950	39.076
35	69.020	39.084
40	69.097	39.097
45	69.176	39.111
50	69.256	39.126
55	69.330	39.142
60	69.401	39.158
65	69.467	39.168
70	69.522	39.177
75	69.568	39.185
80	69.601	39.191
85	69.620	39.195
90	69.628	39.197

A TABLE of the Geographical Miles contained in One Degree of LONGITUDE, in any Degree of LATITUDE.

Deg. Lat.	Geog. Miles	D. Geog. L. Miles	D. Geog. L. Miles	D. Geog. L. Miles
0	60.00	23.55.23	46.41.68	69.21.50
1	59.99	24.54.81	47.40.92	70.20.52
2	59.96	25.54.38	48.40.14	71.19.53
3	59.91	26.53.93	49.39.36	72.18.54
4	59.85	27.53.46	50.38.57	73.17.54
5	59.77	28.52.97	51.37.76	74.16.53
6	59.67	29.52.47	52.36.94	75.15.53
7	59.55	30.51.96	53.36.11	76.14.51
8	59.41	31.51.43	54.35.27	77.13.50
9	59.26	32.50.88	55.34.41	78.12.47
10	59.09	33.50.32	56.33.55	79.11.45
11	58.89	34.49.74	57.32.68	80.10.42
12	58.68	35.49.15	58.31.79	81.9.38
13	58.46	36.48.54	59.30.90	82.8.34
14	58.22	37.47.92	60.30.00	83.7.31
15	57.95	38.47.28	61.29.09	84.6.27
16	57.67	39.46.62	62.28.17	85.5.22
17	57.38	40.45.96	63.27.24	86.4.18
18	57.06	41.45.28	64.26.30	87.3.14
19	56.73	42.44.58	65.25.35	88.2.09
20	56.39	43.43.88	66.24.40	89.1.05
21	56.01	44.43.16	67.23.44	90.0.00
22	55.63	45.42.42	68.22.47	



## THE TIDES.

1. THE Ebbing and Flowing of the Sea is caused by the Sun and Moon's Attractions of it.
2. At New and Full Moons, the Tides are greatest; at the Quarters least. The first are called Spring Tides, the latter Neap Tides.
3. The Spring Tides happen 2 or 3 Days after New and Full, and the Neap as many Days after the Quarters; and not at the New and Full, and the Quarters.
4. The greatest Tides also happen when the Moon and Sun are nearest the Earth.
5. The Tides are the higher when the Moon (and Sun also) is in the Equinoctial.
6. They are greater in lesser Latitudes, and less in greater.
7. The Time and Height of Tides in particular Places are different, according to the Places and Situation.
8. The Origin of Springs and Rivers are partly accounted for by the Vapour-Exhalation from the Sea, and its Circulation through the Atmosphere. — See *Emers. Geogr.*

## GEOGRAPHICAL PROPOSITIONS.

- I. THE Latitude of any Place from the Equator is always equal to the Height of the Pole at that Place, and the contrary.
- II. The Height of the Equinoctial at any Place is always equal to the Complement of Latitude from the Equator, or Distance from the Pole, at that Place.
- III. All Places lying on the Equator, or under the corresponding Equinoctial, have no Latitude; because at the Equator the Latitude begins.
- IV. The Two Places under the North and South Poles have the greatest Latitude, or 90 Deg. because there the N. and S. Latitude ends.
- V. All Places lying under the First Meridian have no Longitude; because there the reckoning of Longitude begins.
- VI. Those Places lying next to the West Side of the First Meridian have the greatest Longitude; because there the Longitude ends.
- VII. All Places lying on either the North or South Side of the Equator have the greater or less Latitude according to their greater or less Distance therefrom.
- VIII. All Places lying on the Equator, East or West of the First Meridian, have the greater or less Longitude according to the greater or less Distance therefrom.
- IX. All Places lying out of the Equator, between it and either the N. or S. Pole, East or West from the First Meridian, have the greater or less Longitude according to the greater or less Distance of Meridians therefrom; which Longitudes are measured by the Intersection of the respective Meridians with the Equator.
- X. The Place lying exactly under the Intersection of the First Meridian and Equinoctial has neither Latitude or Longitude; because there both the Latitude and Longitude begin to be reckoned.
- XI. No Place on the Earth's Surface is distant from another above One-half of the Earth's Circumference.
- XII. No Place of the Earth is distant from another, in a right Line, above the Earth's Diameter.
- XIII. The sensible Horizon changes with the Situation of the Place; and its Semidiameter varies according to the Refraction of the Sun.
- XIV. All Countries equally, in respect of Time, enjoy the Sun's Light, and are equally deprived thereof.

- XV.** In all Places (except under the arctic and antartic Circles) the Days are 12 Hours long when the Sun is in the Equinoctial, or without Declination.
- XVI.** In all Places of the Earth the Days are unequal; except when the Sun is in the Equinoctial, without Declination.
- XVII.** The nearer any Place is to the Equator, the less is the Difference between the Length of the Days and Nights; and the farther therefrom it is the greater.
- XVIII.** In all Places lying under the same Parallel of Latitude, the Days and Nights are of the same Length, at all Seasons of the Year, when the Sun is nearly in the same Place and Declination.
- XIX.** In Places lying equally distant in Latitude from each other, between the Equator and either Pole, their longest Days do not equally increase. The longest Days of Places equally increasing their Latitude increases unequally.
- XX.** In all Places of the Torrid Zone, the Morning and Evening Twilight is least, in the Frigid, greatest, and in the Temperate, betwixt both.
- XXI.** In all Places lying in the Torrid Zone, the Sun is vertical twice in a Year; to those under the Tropics, once a Year; but to those in the Temperate Zones, never.
- XXII.** In all Places of the Two Frigid Zones the Sun appears every Year, for a Number of Days, without setting; and disappears as long, without rising. The nearer to, or farther from, the Poles those Places are, the longer or shorter is the Sun's Presence and Absence.
- XXIII.** In all Places exactly in  $66\frac{1}{2}$  Deg. Lat. N. and S. under the Arctic and Antarctic Circles, the Sun, at his greatest Declination, appears every Year for One Day without setting; and disappears the next Day; but rises and sets at all other Times of the Year.
- XXIV.** In all Places between the Equator and N. Pole, the longest Day and shortest Night is when the Sun has the greatest northern Declination; and the shortest Day and longest Night when the Sun has the greatest southern Declination.
- XXV.** In all Places between the Equator and S. Pole, the longest Day and shortest Night is when the Sun has the greatest southern Declination; and the shortest Day and longest Night, is when he has the greatest northern Declination.
- XXVI.** In all Places on the Equator, or under the Equinoctial correspondent, the Meridian Shadow of a perpendicular Object casts itself towards the North for One half Year, and towards the South for the other.
- XXVII.** In all Places under the Equinoctial, or on the Equator, there is no Meridian Shadow when the Sun is in the Equinoctial; because the Sun is then vertical.
- XXVIII.** The nearer Places are to or from the Equator, the shorter or longer will be the Meridian Shadow of Objects; because the Sun has the greater or lesser Altitude.
- XXIX.** The farther Places are from the Equator (not exceeding  $66\frac{1}{2}$  Degrees of Latitude) the greater will be the Sun's Amplitude of Rising or Setting from the East and West Points of the Horizon; because his Distance in the Ecliptic at Rising and Setting will be the less Distance from those Points, or those in which the Sun rises and sets at his least and greatest Declination, called the Summer and Winter Solstices.
- XXX.** In all Places lying under the same Semicircle of the Meridian, the Hours of Day and Night are equal.
- XXXI.** In all Places of the northern and southern Hemispheres, lying under opposite Parallels of Latitude, the Seasons of the Year are contrary.

**XXXII.** In all Places lying in a parallel Sphere, where the Equinoctial is in the Horizon, the Sun's diurnal circular Motion is nearly parallel to the Horizon.

**XXXIII.** In all Places lying in a right Sphere, the Sun's diurnal circular Motion is nearly perpendicular to the Horizon.

**XXXIV.** In all Places lying in an oblique Sphere, the Sun's diurnal circular Motion is always oblique to the Horizon.

**XXXIV.** The Difference of Longitude between two Places being exactly 15 Degrees, the Inhabitants residing in the easternmost Place will count the Time of the Day just an Hour later at the same Time, or Instant, (for at different Instants there may be any Difference of Time) than those residing in the Westernmost Place; because the Sun moving westward, coming to the Meridian of each Place at 12 at Noon, he has still an Hour to spend before he arrives at the second Place's Meridian, (he now being on the Meridian of the first Place) at 12, when it is but just 11 before Noon at the Place westward; and the same Difference later for other Hours must be reckoned. 30 Degrees Diff. of Longitude make 2 Hours, 60 Diff. 3 Hours, &c. later at the easternmost Place, and sooner, at the same Time, at the westernmost. Most Writers have followed the Vulgar Error of sooner under an easterly, and later under a westerly Meridian at the same Time.

**XXXV.** A Person travelling Westward round the Earth, he will lose a Day in reckoning; but going eastward round it he will gain one Day when he arrives at the Place he set out from.

**XXXVI.** If one Person travels westward round the Earth, and another round the Globe eastward at the same Time, they will differ two Days in their Account when they meet at the Place they set out from. The Reason is this: The Meridian of every Place, at which the Sun arrives when it is Noon, as he passes to the Westward, make a Part lost of the 24 Hours, in crossing the Meridians westward with the Sun; and in passing them all, the whole 24 Hours will be lost. For the contrary Reason, passing all the Meridians eastward round the Globe, 24 Hours will be gained. One Day lost and one Day gained by each Traveller, make two Days Difference.

**XXXVII.** If two Persons set out at the same Time, and travel round the terraqueous Globe, one going directly North, and the other directly South, till they meet at the Place they set out from, they will not differ in reckoning Time, because they made no Difference of Longitude.

**XXXVIII.** At either of the Poles there is only one Day and one Night throughout the whole Year; because the Sun is above the Horizon one Half of the Year, and below it the other.

**XXXIX.** At either of the Poles when the Sun is 18 Degrees below the Horizon before his Rising and after his Setting, there is neither Day nor Night for that Time; because there is only Twilight.

**XL.** At the North Pole the Wind always blows directly South, because there is no other Point of the Compass in that Horizon.

**XLI.** At the South Pole the Wind always blows directly North, because there is no other Point of the Compass in that Horizon.

**XLII.** At any Place within the Torrid Zone the Shadow of a Perpendicular Object will go backward at a certain Azimuth before and after Noon, and then return; which accounts for the Going-back and Returning of the Shadow upon the Dial of Ahaz, in the Days of King Hezekiah; except the Dial's Situation was without the Torrid Zone to make it miraculous! when the Sun is in the Zenith of any Place, it will cast no Shadow.

**XLIII.** The Sun is seen by the Refraction of his Rays in the Atmosphere some Time before he rises, and after he sets.

**XLIV.** A Place on the Earth between the Equator and either Pole, may be due East on the Horizon from a first Place, yet the first Place will not lie west on the Horizon



rixion from the Second Place; because of the Earth's Convexity, where the same bearing across all the Meridians, betwixt any two Places, will be a Rhomb Line, or Spiral, and not a right Line.

**XLV.** A Globe will plainly shew the Reasons why two Places cannot lie on one Course contrary betwixt them, in a right Line: as it will evidently shew the plain Truth of all the foregoing Propositions: therefore no Person who would perfectly understand Geography should be without a Pair of Globes, the Terrestrial and Celestial one, for immediately and clearly answering all Questions that can be proposed in Geography and dependent Astronomy with the greatest Facility.

**XLVI.** A Pair of Globes is the Ground-Work or Foundation of all Geographical and Astronomical Knowledge, by which only perfect Ideas in those Sciences are first clearly obtained, and afterwards fixed in the Memory, so as to make Maps and Planispheres of the Earth and Heavens rightly understood, to be applied to Use, in the Absence of the terrestrial and celestial Globe: As without which artificial Means no Learner can acquire just and perfect Ideas in the said Sciences.

PALLADIUM AUTHOR.

DEFINITIONS, and DIRECTIONS, preparatory to the Use of the Terrestrial and Celestial GLOBE.

Terrestrial	}	shews	{	Land, Water, Bearing, Latitude, Longitude, Sun-rising,
				Setting, Length of Day and Night, &c.
Celestial	}	shews	{	Stars and Sun's Rising, Setting, Ascension, Declination,
				Almicanters, Azimuths, &c.

TERRESTRIAL GLOBE.

Parts	{	Inhabited	38,990,569	{	Squ Miles	{	Number of Inhabitants by
		Uninhabited	160,522,021				Political Arithmetic.

199,512,590

935,000,000

Great Circ.	VI.	{	Meridian	{	Divides the Globe	{	N. and S.	{	Latitude.		
							Equator		into 2 equal Parts	E. and W.	Longitude.
							Horizon			Upper, and	Winds, Signs, and
									Lower	Calendar.	

Colures	{	{	Equinoctial	{	passes through	{	Aries	{	Vernal	{	Equinox.
							Libra		Autumnal		
							Cancer		Summer		
							Capricorn		Winter		
			Solstitial						Solstice.		

Zodiac—cuts the Equator obliquely, and includes the Ecliptic, the Sun's Path.

Small Circles	IV.	{	Tropics	{	Capricorn S.	{	Equator	{	23½° S.	{	Tor.				
									Cancer N.						
									Arctic		Extend fr.	Poles.	23½° N.	encomp.	Frig.
									Antarctic						None.
			Polar												

Derivations	{	Colures	{	Zodiac	{	Tropics	{	Horizon	{	Arctic	{	Antarctic	{	Equator	{	Equinoctial	{	Meridian	{	Koloroi, Great Circles, by Way of Eminence.	
																					Zoes, Animal
																					Treps, to Turn
																					Orizon, Terminating
																					Arctos, a Bear
																					Anti, Opposite
																					Equalis, Equal
																					Equinox, equal Night
Meridian, Noon																					
																			12 Signs representing 12 Animals		
																			Sun's turning at Tropics.		
																		Terminating our View.			
																		N. Star in Ursa Major's Tail			
																		being opposite to Arctis.			
																		Equator			
																		Equal Day and			
																		Night.			
																		Meridian, Noon Day.			

Position

*Positions of the Spheres, and Names of different Inhabitants upon the Terrestrial Globe, have been defined in Page 18.*

*Altitude* } shewn by Degrees } above } Quadrant of  
*Amplitude* } } on } Altit. shews  
*Zenith* } Upper } Points of the Globe } above } Horizon } Beatings.  
*Nadir* } Lower } } under } 90 Degrees.  
*Almacantbers, Parallel* } Circles } through Zenith and Nadir.  
*Azinuths, Vertical* } }  
 Globe rectified by raising the N. or S. Pole above the Horizon as many Degrees as is Latitude from the Equator.

*Places* { Sun } Brought to the { Longitude } marked on { Ecliptic.  
 { Stars } Meridian have { Right Ascension } { Equator.  
 { } { Latitude } { Meridian.  
 { } { Declination }

*Place, at the Meridian, Index at the Hour of the Day, the Hour will shew the Difference of Time, in all Places touching the Meridian, as the Globe is turned round.*

*Sun's Place in Ecliptic, found by Calendar Signs on the Horizon, from the Day of the Month thereon.*

*Sun Vertical, on a given Day and Hour, to Inhabitants under the Parallel of that Day's Declination, as it apparently moves from East to West. When the Index is first set to 12, with London at the Meridian.*

GLOBE rectified for PLACE where the SUN is VERTICAL.

When Sun's Declination N. or S. and Lat. N. or S. equal, the Sun is vertical at Noon.

Upper } Hemi- { Day } up } Noon | E. | Side of | Sun } bef. R. { 18° bel } Twi-  
 Lower } sphere { Nig } low } Midn | W | Horiz. | Sun } after S. { Horiz. } light.

An Eclipse is visible to all Inhabitants above the Horizon.

GLOBE rectified for LATITUDE of any PLACE.

*Index at XII.* { Sun at } Meridian } Brought { E. } Shews { Hour of } Rising.  
 { } { E. Horizon } { W. } { Length of Day. } Setting.

*Meridian Circles cut by Parallels* { Diurnal } { above } HorMark { Day.  
 { } { Noctur. } { below } { Night.

*Sun's Place brought to Meridian, Index set at Noon to 12, the Globe turned about, its Index will point to the Hour on the Hour Circle, at any Altitude or Depression of the Sun, by the Quadrant.*

*Stars are seen* { Rising } on { E. } Edge of the Horizon.  
 { Setting } { W. }  
 { Culminating under the Meridian.

*Stars brought to* { Horizon } Index shews their { Rising and Setting.  
 { Meridian } { Culminating.

*Stars* { Rise, } { Cosmically } at { Rising } Stars { Rise Helia } at { Em.  
 { Sett } { Acronically } Sun { Setting } Stars { Sett Gally } their { Imm

24 { Italian } Hours after Sun { Setting.  
 12 { Babylonish } { Rising.  
 { Jewish }

*Longitude* } of any Point in the Heavens, Distance from { First Point in Ecliptic.  
*Latitude* } { Ecliptic N. or S.

After the foregoing Definitions and Preparations, the Use of the Globes will be very easy to every Learner, who, by a little Practice, will soon become Master of readily answering every Geographical Problem on the Globe that can be proposed.

CONSTELLATIONS on the CELESTIAL GLOBE.					CONSPICUOUS STARS in the Constellations.				
NORTH. SIGNS.		Stars	1 <sup>st</sup> M.	SOUTH. SIGNS.		Stars	1 <sup>st</sup> M.	Stars.	Constell.
☉ enters				☉ enters				Achernar	Eridanus
Spring.	Aries, Mar. 20	46	C	Autum.	Libra, Sept. 22	33	C	Acubens	Cancer
	Taurus, Ap. 20	109	1		Scorp. Oct. 23	44	1	Adigege	Cygnus
	Gemi. May 21	94	1		Sagitt. Nov. 22	48	0	Albiero	Taurus
Summer.	Cancer, Jun. 21	75	C	Wint.	Capric. Dec. 21	58	0	Aldebaran	Pegasus
	Leo, - July 23	91	2		Aquar. Jan. 20	93	0	Alfaras	Corona Sept.
	Virgo, Aug. 23	93	1		Pisces, Feb. 18	11	0	Alfeta	Capricorn
		508	5			386	1	Algerib	Perseus
N. CONSTELLATIONS.				S. CONSTELLATIONS.				Algol	Corvus
Ursa	Minor -	12	C	Cetus	—	80	0	Algorab	Ursa Major
	Major -	105	C	Æridanus	—	72	1	Alioth	Crater
Draco	—	49	C	Phenix	—	13	0	Alkes	Andromeda
Cepheus	—	40	C	Tochan	—	9	0	Almaach	Aquile
Canes Venatici	—	24	C	Orion cum Scuto	—	93	2	Altair	Scorpio
Bootes	—	53	1	Monoceros	—	32	0	Antares	Bootes
Mons Mænalus	—	11	C	Canis Minor	—	14	1	Arcturus	Lyra
Coma Berenices	—	24	C	Hydra	—	53	0	Asengue	Venatici
Cor Caroli	—	3	C	Sextans Urania	—	4	0	Asterion	Orion
Corona Septentrion.	—	11	C	Crater	—	11	0	Bellatrix	Ursa Major
Hercules	—	92	C	Corvus	—	8	0	Bernetna.	Orion
Cerberus	—	9	C	Centaurus cum Lupo	—	72	2	Betelguef.	Argo
Lyra	—	24	1	Ara cum Thuribulo	—	9	0	Canopus	Auriga
Cygnus	—	73	C	Triangul. Australis	—	5	0	Capella	Gemini
Anser cum Vulpec.	—	39	C	Pavo	—	14	0	Castor	Venatici
Lacerta	—	12	C	Corona Australis	—	12	0	Chara	Hydra
Cassiopea	—	52	C	Prus	—	14	0	—	Scorpio
Camelopardalus	—	23	C	Pisces Australis	—	15	1	—	Ursa Major
Serpens	—	50	C	Lepus	—	25	0	Dubbe	Cetus
Serpentarius	—	67	C	Columbus Noachi	—	10	0	Elcatis	Pegasus
Scutum Sobieski	—	8	C	Robor Caroli	—	13	0	Enif	Pisces
Aquila cum Antine	—	63	1	Argo Navis	—	48	1	Fomalhat.	Auriga
Delphinus	—	18	C	Canis Major	—	29	1	Hædi	Taurus
Equuleus	—	12	C	Apous	—	4	0	Hyades	Pegasus
Sagitta	—	13	C	Hirundo	—	11	0	Markab	Cetus
Andromeda	—	66	0	Indus	—	12	0	Mencar	Andromeda
Perseus cum Medusa	—	67	1	Crux	—	4	0	Mirach	Bootes
Pegasus	—	81	C	Cameleon	—	10	0	N. Star	Ursa Minor
Auriga	—	46	1	Pisces Volans	—	7	0	Pes	Centaurus
Lynx	—	55	C	Xiphias	—	7	0	Pleiades	Taurus
Leo Minor	—	20	C					Pollux	Gemini
Trian.	Magnum	10	C	30 South	—	710	9	Procyon	Canis Minor
	Minor	8	C	34 North	—	1243	5	Rafalgeth	Hercules
Musca	—	6	C	12 In Zodiac	—	894	6	Regulus	Leo
Sum	—	1243	5	76	Total	2847	20	Regel	Orion
Besides these Stars, there are 3 in Orion's Girdle, and the 2 Points in Ursa Major.					Scheat				
The GALAXY, Via Lactea, Milky Way or White Path, is a broad circular Space filled with Stars of the smallest Magnitude, casting a confused Splendor of Light quite round the Heavens.					Schedar				
A circular Space powdered with Stars! MILTON.					Spica				
					Syrius				
					Vega				
					Vindematrix.				



## PLANETS.

PRIMARY VI.	Diur. Rot. on its Axis.	Annual Period round ☉	Dia. in Engl. Miles	Distances from Sun in Engl. Miles.	☉ Sun in Center.
	H. M. S.	Days. H.			d h m
Super. Infer.	Mercury	Uncertain	87 23	3000	36,841,468
	Venus	23 0 4	224 17	9330	68,891,486
	Earth	23 56 4	365 6	7970	95,173,000
	Mars	24 40 0	686 25	5400	145,014,148
	Jupiter	9 56 0	4332 12	94,000	494,990,976
	Saturn	Uncertain	10759 8	78,000	907,956,130

☉ Sun in Center.

d h m

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Jupiter } has { Belts & IV } Moons { discovered last } *Galileo*, a Florentine.  
 Saturn } has { A Ring & V } Moons { Century by } *Cassini*, a Piedmontese.  
 Venus } seen { before } { after } { Rising } { Setting } { called } { *Phosphorus*, or Morning } { *Hesperus*, or Evening } { Stat.

SECONDARY or Satellites X. Period round the Primary. Dist. from Primary in Semidiam<sup>s</sup>. We shall now proceed in order to give the Subdivisions of the Grand Divisions of EUROPE, ASIA, AFRICA, AMERICA, the Boundaries, Position, Climate, Latitude, Longitude, Length, and Breadth, Number of Square Miles, and Inhabitants in each. We shall descend into Subdivisions of their Languages, Cities, Chief Towns, Coronation Places, Bearings from

	I	II	III	IV	I	II	III	IV	V
About Jupiter.	1 18 28 15	3 13 18 50	7 3 59 40	16 18 5 5	1 21 18 30	2 17 41 12	3 12 25 12	5 22 41 15	79 7 48
About Saturn.									

Rome, the Center, Ports, Oceans, Seas, Gulphs, Bays, Straits, Islands, Isthmuses, Capes, Promontories, Rivers, Lakes, Mountains. Religions, Forms of Government, Patriarchates, Archbishopsricks, Bishopsricks, Universities, Academies, Orders of Knighthood, Commodities, Productions, Curiosities, &c. with a List of uninhabited Islands, Ruins of celebrated Places, Countries and Places known by different Names, and antient Names of remarkable Seas and Rivers. Exhibiting, at One View, all the Empires, Kingdoms, States, Republicks, Provinces, Tiles, &c. in the World.

When the Subdivision of each Kingdom, Province, or Country is finished, which will (we expect) be concluded in our next *Palladium*, we shall afterwards proceed to the concise *History* of PARTICULARS, the most interesting and worthy of Notice; constituting a *Natural* and *Historical Account* of the whole *Terraqueous Globe*, methodized.

We begin with a Specimen of the *Grand* and *Subdivisions* of our own Country.

## GRAND DIVISIONS OF THE WORLD.

## EUROPE, ASIA, AFRICA, AMERICA.

## Computation of the Inhabitants upon the whole Earth.

The *Earth* is computed to be capable of subsisting *Three thousand Millions* of the *human Species*, though a Third Part of that Number never existed at *One Time*. The following *CALCULATION*, by a new Kind of *political Arithmetic*, is an Estimate of Mankind now living upon the Face of the Earth.

	M. C. Th.		M. C. Th.		M. C. Th.
In Gr. Britain	7,500,000	Rep. of the		Hungary	5,000,000
Ireland	2,600,000	Unit. Prov.	3,200,000	Poland	3,200,000
France	18,400,000	Austr. Netherl.	1,500,000	Turkey in Eur.	18,400,000
Spain	7,400,000	Savitz. & the			
Portugal	3,600,000	Rep. of Gene.	3,100,000	Europe cont.	125,300,000
Italy	4,100,000	Sweden	3,300,000	Asia	450,000,000
Islands in		Denmark	2,100,000	Africa	150,000,000
Mediterr.	2,700,000	Norway	1,600,000	America	160,000,000
Germany	20,600,000	Russia	17,000,000		
					885,300,000

## SUBDIVISION OF EUROPE.

Position N. W. of Rome, the Center.—Climate from VI. to XI.

Latitude.	Longitude.	M. Len.	M. Bre.	M. Square	Inhabitants.
35° to 71° N.	10° W. to 65° E.	3000	2500	4,456,065	153,000,000
					Com. Comp.

BOUNDARY { Frozen Ocean, N. | Mediterranean Sea, S.  
 Asia or Black Sea, E. | Atlantic Ocean, W.

LANGUAGE { Albanese, Bohemian, Biscayan, Carniolan, Dalmatian, Danish,  
 Dutch, English, French, Greek, Greenlandish, Irish, Italian,  
 Muscovite, Norwegian, Portuguese, Polish, Saxon, Sclawonian,  
 Spanish, Swedish, Tartarian, Turkish, Welsh.

## ENGLAND and WALES, Kingdom W. of Rome.

Latitude.	Longitude.	M. Length	M. Breadth	M. Square	Inhabitants.
50° to 56° N.	2° to 60° W.	360	300	49,450	5,200,000

BOUNDARY { Scotland, N. | English Channel, S.  
 German Ocean, E. | St. George's Channel, W.

## ENGLAND-DIVISION.

Counties, 40.—Circuits, 6.—Members of Parliament, 476.—Climate 9.  
Chief Town, LONDON.

Count.	Mem.	C. Town.	Count.	Mem.	C. Towns	Count.	Mem.	C. Towns				
Home Circ. 5	Essex	8	Chester	8	Oxf. sh.	9	Oxford	6	Hants	26	Winch.	
	Herts	6	Hertf.		Berks	9	Reading		Wilts	34	Salisbur.	
	Kent	10	Canter.		Gloucesf.	9	Gloucesf.		Dorsetf.	20	Dorch.	
	Surrey	14	Guildf.		Worcef.	9	Worcef.		Som. f.	18	Bristol	
	Sussex	20	Chichef.		Monm. f.	3	Monm.		Devonf.	26	Exeter	
Norfolk Circ. 6	Bucks	14	Buckin.	7	Heref. f.	8	Hereford	6	Cornw.	44	Lancef.	
	Bedf. sh.	4	Bedford		Salop	12	Shrewf.		Yerksf.	30	York	
	Hunt. f.	4	Huntin.		Staff. f.	10	Stafford		Durham	4	Durham	
	Camb. f.	6	Cambri.		Warw. f.	6	Warwic.		Northu.	8	Newca.	
	Suffolk	16	Ipswich		Leicesf. f.	4	Leicefter		Lancasf.	14	Lancast.	
Norfolk Circ. 6	Norfol.	12	Norwic.	2	Derbyf.	4	Derby	2	Westm.	4	Appleby	
					Nott. f.	8	Notting.		Cumber.	6	Carlisle	
					Linc. f.	12	Lincoln		Middlesex	8	London	
					Rutl. f.	2	Okeham					
					North. f.	9	Northa.					

WALES.

## WALES-DIVISION.

Counties, 12.—Members, 24.—Circuits, 4.—*Welsh* Inhabitants 800,000.  
Climate, 9.

Coun. Mem. C. Towns.		TITLES.	
N.E. 3	Flintsh. 2 Flint	King of Great Britain.	Archbp. of Canterbury,
	Denbysh. 2 Denbigh	France, and Ireland; De	Primate of all England.
	Mont. f. 2 Montgo.	fender of the Faith; D.	[London, Winchester,
N.W. 3	Anglef. 2 Montgo.	of Brunswick and Lunen-	Ely, Lincoln, Rochester,
	Caernar. 2 Caernarv.	burgh; Elector of Han-	Litchfield and Cowen-
	Merion. 1 Harleigh	over; and Ar. Tr. of the	try, Hereford, Wor-
N.W. 3	Radnorsh. 2 Radnor	Holy Rom. Empire, &c.	cester, Bath and Wells,
	Breconsh. 2 Brecknock	Eld. S.—Pr. of Wales.	Exeter, Chichester,
	Glamorg. 2 Cardiff	Coronation—Westmin.	Norwich, Gloucester,
S.W. 3	Pemb. f. 3 Pembroke	Abps. 2.—Bishops 20	Oxford, Peterborough,
	Cardig. 2 Cardigan	Abp. of York, Primate	Bristol.
	Caerm. 2 Caermar.	of England.	Welfs 4 } St. David's, Landaff
		{ Durb. Carlisle. Cbest.	
		{ Sodor and Man.	St. Asaph, Bangor.

ORDERS, 2. { Garter, } UNIVERSITIES, 2. { Oxford,  
Bath. } Cambridge.

Inhabitants in LONDON, 700,000.

## LAND and WATER CONNECTIONS.

SEAS, German, N. E.	MEERS 4 { Wittlesey, Ramsay, So-	
CHANNELS 2 { English, S.	han, E. Winander, N.	
	{ St. George's, W.	
STRAITS, Dover, S. E.	RIVERS 15 Rife. Course. Fall.	
ISLES 6 { Coquet, N. E. Man, N.W.	Thames Gloucester. NE Eng. Cha.	
	Severn Wales SW Brit. Cha.	
	Medway Kent E Thames	
	Ouse Yorkshire S Humber	
HEADS 3 { Flamborough, N.	Humber Stafford. NE } Ger. Ocean	
	Beachey, S.	Tweed Berwick } W
	Holy, W.	Tees Durh <sup>m</sup> . } to }
CAPIES 3 { N. and S. Foreland, S.E.	Tyne Northd } E	
	Land's End, S. W.	Cam Herts NE }
POINTS 3 { Start and Lizard, S. W.	Eden Westmord S to N Solway	
	Brahichipult, W.	Avon Wilts W Severn
	Chiviot and Peake, N.	Derwent Cumb. } Eto }
MOUNTS 6 { Malvern, N. W.	Ribble Lanca. } W }	
	Cotswold, Snowden,	Mersey Cheshire SE } Irish Sea
	and Pinlimmon, W.	Dee Wales W }

## SUBDIVISIONS of SCOTLAND, Kingdom W. of Rome.

Latitude.	Longitud.	M. Length.	M. Breadth.	M. Square.	Inhabitants.
54° to 59° N.	1° to 6° W	300	150	27,794	1,500,000

BOUNDARY { Caledonian Sea, N. Tiviot Hills, S.  
German Sea, E. Irish Sea, W.

Shires,



Shires, 33.—Members, 30.—Royal Boroughs, 66.—Manors, 15.

North Division, 18.		South Division, 15.	
Fifehire.	Royal Boroughs.	Shires.	Royal Boroughs.
	St. Andrew's, Coupar, Kir-	Edinburgh	Edinburgh
	kaldy, Innerkythen, Burnt	Haddington	Dunbar, Queen-
	Island, Crail, Dumfermlin,	Mers	ferry, Hadding-
	Dysart, Anstruther, King-	Roxborough	ton
	horn, Pittenween, Kil-	Selkirk	Duns, Berwick,
	renny.	Peebles	Lauder
	Shires.	Lanerk	Jedburgh
	Clackmanan	Dumfries	Selkirk
	Kinross	Wigton	Peebles
	Perth	Kirkcudbright	Glasgow, Lan-
	Dumbarton	Air	erk, Ruglea
	Argyle	Bute	Dumfries, San-
	Barr	Renfrew	quehar, Annan,
	Kincardin	Stirling	Lochmaben
	Forfar	Linlithgow	Wigton, Gallo-
	Aberdeen		way, Stranra-
	Inverness		ver, Whitehorn
	Nairn		Kirkcudbright
	Cromartie		Air, Irwin
	Elgin		Rothfay
	Ross		Renfrew
	Southerland		Stirling
	Caithness		Linlithgow
	Orkneys		

Chief Town, EDINBURGH. — Dist. from LONDON, 400 Miles N.

UNIVERSITIES, 4 { Aberdeen, St. Andrew, Edinburgh, Glasgow

TITLE, See ENGLAND. — Coronation, SCONE. — Order, THISTLE. — Climate, 10. — Number of Inhabitants, in EDENB. 65,000.

LAND and WATER CONNECTIONS.

SEAS, 3. — Caledonian, N. — German, E. — Western, W.  
 BAYS, 4. — Thurso, N. — Wick, N.E. — Wigton, S. — St. Andrew, E.  
 HEADS, 3. — Ord, Kynaird, N.E. — St. Abb's, E.  
 CAPES, 3. — Ronaldshaw, N. — Eucharf, E. — Wreath, N.W.  
 POINTS, 3. — Mather, E. — Fairland, S.W. — Cannord, N.W.  
 LOCHS, 4. — Ness, N. — Tay, E. — Lomond, S. — Abber, W.  
 MOUNT, 5. — { Grampian, E. to W. — Pentland, S.E.  
 { Lammermuir, E. — Tivot, Hoy, N.E.

RIVERS, 10.		Rise.	Course.	Fall.
Forth	—	Monteith	—	
Tay	—	Broadalban	—	
Spey, Don, Dee	—	Badenoch	—	
Murray	—	Murray	—	
Cromarty	—	Cromarty	—	
Dornock	—	Dornock	—	
Tweed	—	Lanerk	—	
Clyde	—	Annandale	—	

W. to E.

German Sea.

S. E.

Irish Sea.

# ANNUAL MISCELLANY, 1777.

31

SUBDIVISIONS of IRELAND, Kingdom W. of Rome.

Latitude. Longitude. Length. Breadth. Sq Miles. Inhabit.  
 51° to 55° N.—6° to 10° W.— 285 — 160 — 27,457—2,000,000

BOUNDARY { Caledonian Sea, N.—St. George's Channel, S.  
 Irish Sea, E.—Atlantic Ocean, W.

PROVINCES, 4.—COUNTIES, 32.—MEMBERS, 296.

LEINSTER, E.

Counties. Mem. Chief Towns.

Co. 5. Mem. 128	Dublin	- 10	Dublin
	Louth	- 10	Drogheda
	Wicklow	- 10	Wicklow
	Wexford	- 18	Wexford
	Longford	- 10	Longford
	East Meath	14	Trim
	West Meath	10	Mullingar
	K's County	6	Philipstown
	Q's County	8	Maryborough
	Kilkenny	- 16	Kilkenny
Co. 6. Mem. 12	Kildare	- 10	Kildare
	Catherlough		or Carlow 10 Caterlough

MUNSTER, S.

Counties. Mem. Chief Towns.

Co. 6. Mem. 64	Cork	- 26	Cork
	Clare	- 4	Ennis
	Kerry	- 8	Tralee
	Limerick	- 8	Limerick
	Tipperary	- 8	Clonmel
Co. 8. Mem. 4	Waterford	- 10	Waterford

CONNAUGHT, W.

Counties. Mem. Chief Towns.

Co. 5. Mem. 30	Leitrim	- 6	Leitrim
	Roscommon	8	Roscommon
	Mayo	- 4	Mayo
	Sligo	- 4	Sligo
	Galway	- 8	Galway

ULSTER, N.

Counties. Mem. Chief Towns.

Co. 5. Mem. 74	Down	- 14	Downpatrick
	Ardmagh	- 6	Charlemont
	Monaghan	- 4	Monaghan
	Cavan	- 6	Cavan
	Antrim	- 10	Antrim
	Londonderry	8	Derry
	Tyrone	- 10	Omagh
Co. 9. Mem. 9	Fermanagh	4	Enniskillen
	Donegal	- 12	Donegal

Chief Town, DUBLIN.—Dist. from  
 LOND. 270 Miles, N.W.—Clim. 9.  
 Inhabitants DUB. 300,000.—Title.  
 See ENGLAND.—DUB. University.

Bishops, 18

ARMAGH, 7	{ Derry, Meath, Clogher, Raphoe, Kilmore and Ardagh, Dromore, Down and Connor.
DUBLIN, 3	—Kildare, Leighlin and Ferns, Ossory.
CASHEL, - 5	—Limerick, Waterford, Cork and Ross, Clonyne, Killaloe.
TUAM, - - 3	—Elphin, Clonfert, Killala.

LAND and WATER CONNECTIONS.

SEAS, 3	—	Atlantic Ocean, W.—Irish Sea, E.—St. George's Channel, S.
BAYS, 7	{	Carickfergus, N. E.—Drogheda, E.—Dingle, S. W.—Gal-
		way, W.—Youghal, S. E.—Donegal, Sligo, N. W.
HEADS, 3	—	Fair, N. E.—Enniscorthy, N. W.—Heath, W.
CAVES, 3	—	North, N.—Clear, S.—Dorset, S. W.
MOUNTS, 5	{	Mourne, Isea, N.—Knockpatrick, W.—Slieve Logher, Slieve
		Bloom, E.

RIVERS, 7.

Rise.

Course.

Fall.

Shannon	—	Leitrim	—	S. W.	} Atlantic
Lee	—	Corke	—	E.	
Blackwater	—	Logher	—	S.	
Burrow	—	Bloom	—	S.	} St. Geo. Channel
Liffy	—	Wicklow	—	N. E.	
Boyne	—	Queen's County	—	N. E.	} Irish Sea
Don	—	Down	—	N. W.	
		Neach, Swilly, Foyle,		N.	Lough Neagh.
					Earn.

LOUGHS, —Neach, Swilly, Foyle, N.

A TABLE

Archb's.	Bishopricks. The Numerals shew the Order of Precedence.	Value of each Bishoprick as stated in the King's Books.	Parishes in each Dioc.	Counties Names. $\frac{1}{2}$ Denotes half the C. in one Dioc. and half in the other, as Cumb	Sax. Hept.	Miles Circ.	Number of Acres in each Coun- ty.
		l. s. d.					
York Province, 4.	Durham IV.	2821 1 1	137	{ Northumberland	Northumberland.	149	1370000
	Carlisle	531 4 11	93	{ Durham		107	610000
	Chester	420 1 8	256	{ Westmoreland		120	510000
				{ Cumberland		168	1040000
	York II.	1000 0 0	581	{ Lancashire	Northumberland.	170	1500000
				{ Cheshire in Mercia		112	770000
				{ Yorkshire		320	3770000
				{ Nottinghamshire		110	560000
	Coventry and Litchfield	703 5 2	557	{ Derbyshire	Kingdom of Mercia.	140	680000
				{ Staffordshire		151	810000
	Worcester	1049 17 3	241	{ $\frac{1}{2}$ Warwickshire		135	670000
				{ Worcestershire		130	540000
	Hereford	768 10 10	313	{ Shropshire		134	890000
				{ Herefordshire		102	660000
	Gloucester	315 7 2	267	{ Gloucestershire		138	800000
				{ Oxfordshire		130	534000
	Oxford	354 16 4	195	{ Northamptonsh.		133	550000
				{ Rutlandshire		40	110000
	Peterborough	414 19 11	293	{ Leicestershire		97	560000
				{ Lincolnshire		180	1740000
	Lincoln	830 18 1	1255	{ Huntingdonshire		67	240000
				{ Bedfordshire		73	260000
Canterbury Province, containing 44 Counties, and 18 Bishopricks.	London III.	1117 8 4	623	{ Buckinghamshire	Kingdom of Mercia.	130	441000
				{ Hertfordshire		122	451000
	Norwich	499 8 7	1235	{ Middlesex		80	247000
				{ Essex		150	772000
	Ely	2134 18 5	141	{ Suffolk	West Saxons, S.Sa. K.E. Ang. E.Sax.	145	995000
				{ Norfolk		135	1148000
	Canterbury I.	4233 8 8	257	{ Cambridgeshire		125	570000
				{ Kent		162	1248000
	Rocheſter	358 3 8	98	{ Suffex	West Saxons, S.Sa. K.Sa.	158	1140000
				{ Surry		112	592000
	Chicheſter	677 1 3	250	{ Hampshire		149	1312000
				{ Berkſhire		30	527000
	Wincheſter V.	3885 3 5	362	{ Wiltſhire		140	876000
				{ Dorſetſhire		140	772000
	Salisbury.	1367 11 8	444	{ Somerſetſhire	West Saxons, S.Sa. K.Sa.	150	1075000
	Bristol	383 8 4	236	{ Devonſhire		185	1920000
	Bath and Wells	527 14 2	388	{ Cornwall		150	960000
	Exeter	1566 14 6	604				

We ſhall next proceed to give the Subdiviſions of the Reſt of Europe in our next Year's Palladium, viz.

1. Norway.	6. Pruffia.	10. Netherlands	14. Switzerland
2. Denmark.	7. Germany.	11. France.	15. Italy.
3. Sweden.	8. Bobemia.	12. Spain.	16. Hungary.
4. Ruſſia.	9. Holland.	13. Portugal.	17. Turkey.
5. Poland.			All



## SUBDIVISIONS OF ENGLAND.

Number of Parishes in County	Hundred's	Market T.	Parishes in each County	Members Par.	Pro. L. Tax	Chief Towns. C. denotes Cities, & the Figures the No. of P. Church. in each	Situation fr. London	Com. Miles fr. London	Market Days at each Place	Most noted Rivers.
00000	6	11	46	8	5	Newcastle	4 V W	212	Tuef. S.	Tine, Tweed
00000	4	6	118	4	2	Durham C.	6 N W	200	S	Tine, Derwent
00000	5	8	26	4	1	Kendal	1 N W	202	S	Eden, Lon, Keny
00000	5	15	58	6	1	Carlisle C.	N W	230	S	Eden, Kirltop
00000	6	23	36	14	5	Lancaster	1 N W	187	S	Mersey, Ribble, Lon
00000	7	12	68	4	7	Chester C.	11 N W	140	W S	Dee, Mersey, Weaver
00000	26	50	563	30	24	York C.	30 N W	150	Th S	Humber, Ouse, Swale
00000	8	9	168	8	7	Nottingham	3 N W	96	W F S	Trent, Erwasf
00000	6	9	106	4	0	Derby	15 N W	98	F	Trent, Derwent
00000	5	18	130	10	7	Stafford	2 N W	106	S	Trent, Dove, Pink
00000	5	14	158	6	10	Warwick	2 N W	68	S	Avon
00000	7	11	152	9	9	Worcester C.	9 N W	85	W S	Severn, Avon, Tame
00000	15	14	170	12	5	Shrewsbury	5 N W	118	W Th S	Severn, Rea, Ferme
00000	8	8	176	8	5	Hereford C.	4 N W	102	W F S	Arrow, Lug, Frome
00000	30	25	280	8	12	Gloucester C.	12 N W	82	W S	Severn, Wye, Avon
00000	14	15	280	9	10	Oxford U. C.	14 N W	47	W S	Tame, Isis, Cherwell
00000	20	15	326	9	12	Northampton	14 N W	55	S	Charv. Nen. Weland
00000	5	2	48	2	2	Okenham	1 N W	68	S	Weland, Wash
00000	6	1	200	4	7	Leicester	3 N W	80	S	Avon, Reake, Stower
00000	30	30	630	12	19	Lincoln C.	14 N W	104	F	Trent, Humb. Wyth
00000	4	6	78	4	4	Huntington	4 N	48	S	Ouse
00000	9	10	110	4	7	Bedford	5 N W	40	Tu S	Ouse, Ivell
00000	8	14	185	14	12	Buckingham	1 N W	44	S	Tame, Ouse, Coln
00000	5	18	120	6	11	Hertford	3 N W	20	S	Coln, Lea
00000	6	6	73	8	80	London C.	11 E. T	00	6	Thames, Coln
00000	20	21	415	8	24	Colchester	10 N E	43	S	Thames, Coln, Lea
00000	22	28	575	16	20	Ipswich	12 N E	60	W F S	Stower, Bieton
00000	31	36	660	12	22	Norwich C.	32 N E	90	W F S	Ouse, Yare, Brin
00000	17	8	163	6	9	Cambridge U.	14 N E	44	S	Ouse, Cam, Grant
00000	66	28	398	18	22	Canterbury C.	16 S E	44	W S	Thames, Medway
00000	65	16	312	28	16	Chichester C.	6 S W	50	W S	Arun, Rother
00000	13	9	140	14	18	Southwark	S	1	6	Thames, Mole, Wey
00000	39	16	253	26	14	Winchester C.	5 S W	52	W S	Stower, Avon, Ichin
00000	20	12	140	9	10	Reading	3 S W	32	S	Thames, Isis, Kennet
00000	29	21	304	34	13	Salisbury C.	4 S W	70	Tu S	Isis, Ken. Willy, Avo.
00000	29	20	248	20	9	Dorchester	3 S W	100	S	Stower, Frome
00000	43	30	385	18	19	Bristol C.	18 al. W	94	W Th	Severn, Avon, Frome
00000	31	37	394	26	21	Exeter C.	15 S W	138	W F	Ex, Tamer, Turridge
00000	9	37	161	14	8	Launceston	15 S W	175	S	Tamer, Camel, Eale

All methodized in the same Manner that we have exhibited the Sub-divisions of England, Scotland, and Ireland; which we hope to perform in less than the Compass of one Sheet of 16 Pages. Then we intend gradually to proceed in giving a Natural and Historical Account of what is most interesting and curious in each of those Countries. And, first, a short and general History of England, Scotland, Ireland, &c. to possess the first Part of each Year's *Palladium*.

## UNINHABITED ISLANDS

Almirante	S. S. Bidolfo- at.	Indian Ocean
Faifants, or		Bet. France &
Conferences		Spain
Fernandes		Chili
Gorgona		Peru
Grandillos		Caribbees
Hogland		Finland G.
Nova Zembla		Frozen Ocean
Pararia Isle		Liparies
Pinos		Caribbees
Pondico — — —		Archipelago
Raclia — — —		
Robin — — —		Casria Coast
Salvages — — —		Canaries
Samballas — — —		Panama Coast
Soana — — —		St. Domingo Coast
Sombrero — — —		Caribbees
Strophades — — —		Ionian Sea
Tinian — — —		Ladrones
Tiiti — — —		Campeachy Bay
St. Vincent — — —		Cape Verd Isles
Virgin — — —		Caribbees

## RUINS of CELEBRATED PLACES.

Arbela stood in	{	Curdistan,
		Perfia
Canna — — —	{	Bari,
		Italy
Carthage — — —	{	Tunis,
		Barbary
Mycene — — —	{	Morea,
		Turky
Nineveh — — —	{	Curdistan,
		Perfia
Paphos — — —	{	Cyprus Isle,
		Turkey
Platea — — —	{	Greece,
		Turkey
Samaria — — —	{	Palestine,
		Turkey
Sayd — — —	{	Syria
Tadmec — — —		Turkey
To, tofa — — —	{	atolia,
		Turkey
Troy — — —	{	Huen Isle,
		Denmark
Uraniburgh, f.	{	Sub S. a

☞ Solomon's } inhabited { little known,  
Otaheite } Isle { lately d. covered }

## ANCIENT NAMES OF REMARKABLE PLACES.

Ancient.	New.	Ancient.	New.	Ancient.	New.
Acheron r.	Savuto	Hebrus r.	Mariza	Palus Meotis	Asoph Sea
Ægean Sea	Archipelago	Hellefpont	Dardareles	Pappontis	Marmora Sea
Boristhenes	Nieper	Hyrcanian	Caspian Sea	Thermo-	Bocca di Lupo
Bosphorus	Cassa Streight	Ionian	Natolia Gulph	pylae str.	Salonicki g.
Eridanus r.	Po	Paclolus	Serabus	Tanaïs r.	Don in Russia
Euxine	Black Sea			Viñula r.	Weissel

☞ Countries and Places known by different Names hereafter.

## TO THE PUBLIC.

THE SEA and LAND INSTRUMENT (called, The UNIVERSAL TRIGONOMETER, or SEAMAN'S SPEEDY CALCULATOR) for mechanically answering all Cases of Sailing and of Trigonometry (Right and Oblique angled) at Sight, is only to be had at Mr. B. COLE's, Fleet-street, London, by bestowing it to be correctly divided. — Where a correctly divided Brass-Instrument for keeping a Ship's Reckoning at Sea (called, The SHIP'S READY RECKONER) may be had for a Guinea.

The Sea-Instrument lately sold in the *Palladium Author's* Name, with a Book of its Use and Description, by D. STELL, for 26 s. may now be had at Mr. BAILEY's, Mathematical Instrument-Maker, Old Gravel Lane, Wapping, for 12 s. being the least Price that Instrument, well divided, can be sold for, with Brass Joints, making it by Dozens; and cannot be afforded for Half a Guinea each; which none but a Taker-in could desire.

## PART II.

ANSWERS to the *ÆNIGMAS* in last Year's PALLADIUM.

I. A HAT.	V. INNOCENCE.	IX. An EWE.
II. The NOSE.	VI. A SIGN.	X. A PISTOL.
III. An AWL.	VII. EVE.	Prize. SNUFFERS.
VI. A MOUSE-TRAP.	VIII. A PAPER-KITE.	

All the *ÆNIGMAS* answered by Mr. John Parker, at Ashby de la Zouch, in Leicestershire.

To the PALLADIUM AUTHOR, and Correspondents.

YOUR most obedient Servant, Sirs, would fain  
 Appear, though meanest of the tuneful Train;  
 Tutor'd by Nature, ignorant of Rules  
 As taught and practis'd in the Classic Schools;  
 At her Impulse my *Fancy* wings her Flight,  
 Through yielding Air, swift as the *Paper-Kite*. 8.  
 To all you Warblers, I most humbly now  
 Put off my *Hat* and make a decent Bow; 1.  
 A poor Mechanic will you entertain,  
 To be your *Candle Snuffer*, Gentlemen? Prize.  
 Some humble Post your Goodness can't refuse,  
 To set your *Mouse-Trap*, or to watch your *Ewes*, 4, 10, 9.  
 And tender Lambkins on the flow'ry Plain,  
 Where fair *Florella* leads the mirthful Train.  
 On your Good-nature I would not encroach,  
 My *Nose* you'll find as sound as any Roach. 1.  
 Our *Eve's* fair Daughters form'd to charm the Sense, 7.  
 I ne'er beguild them of their *Innocence*; 5.  
 Promiscuous Commerce with the Sex resign, 6.  
 For Peace of Conscience—Harmony divine!  
 Nay, if you frown, I'll throw aside my Pen,  
 Pack up my *Awls*—your Servant, Gentlemen. 3.

There is *Humour* and *Wit* in the above Answer; but we have only *Rhetoric* from some of our Correspondents, which we omit to insert. And this Year having so many *Materials* on new Subjects, we have not Room to insert some Answers to the *Ænigmas*, which are very ingenious, and hope our Correspondents will excuse the Omission, to render our *Palladium* for 1777 the more completely useful.

Mr. Isaac Gumley, of Countesthorpe, Land-Surveyor, to Myrtilla, on the Choice of a Husband.

TO you, O Myrtilla, in Matters so nice,  
 I presume, for this once, to impart my Advice:  
 O do not refuse, for awhile, to attend,  
 You know it proceeds from the Heart of your Friend.  
 In the Choice of a Husband, my delicate Fair,  
 Let prudent Discretion exert all her Care;  
 For should you, quite careless, resign yourself up,  
 I fear you will taste but a sorrowful Cup.

E 2

First,



First, let the *dear Creature*, whose Heart you'd engage,  
 Be perfectly *fashion'd*, and near your own Age;  
 For should you be wedded to one that is old,  
 I know you must hate him, in spite of his Gold.  
 O never, *Myrtilla*, let Riches prevail,  
 For soon, very soon, all their Lustre will fail;  
 If you marry for Riches you'll certainly smart,  
 And find, at the last, a dissatisfy'd Heart.  
 Let the Youth of your *Choice* with good Sense be endu'd,  
 To behave with *Decorum*, and shun what is rude;  
 Let native *good Humour* enliv'n his Soul,  
 And a Sense of *Religion* all Evils controul.  
 Let his *Dress* be quite decent, inclined to the *Mode*,  
 For Things that are *odd* I wou'd have him explode;  
 Pray carefully shun all the *frenchified* Beaux,  
 With *Hats* that will scarcely reach over their *Nose*. 1, 2.  
 I scorn, from my Soul, ev'ry finical Fop,  
 Bedizen'd with Trinkets from Bottom to Top;  
 No Bliss you'll receive from such *whimsical* Elves,  
 Their Time is employed in admiring themselves!  
 Be sure you the *Gam'ster* and *Drunkard* avoid,  
 Such Sots of your Company soon will be cloy'd;  
 And leave you at Home, your hard Lot to bewail,  
 For shuff'ling of *Cards*, and for drinking of *Ale*.  
 The *Flatt'rer* detest, he is not to be born,  
 Keep out of the Way, and his *Perfidy* scorn;  
 For shou'd you attend, he perhaps may allure,  
 And then, O *Myrtilla*, Destruction is sure.  
 Let the Man of your *Choice* be *consistent* and *clear*,  
 Industrious and healthy—a Lover *sincere*,  
 A Friend unto *Learning*, intrepid and bold,  
 Quite gen'rous and free, and no slave unto Gold.  
 When e'er such a Youth, as I've mention'd, you find,  
 So graceful in Person, accomplished in Mind,  
 Look down with an *Eye of Regard on the Swain*,  
 Afford him a Smile, and dispel all his Pain;  
 With him, if to live, it shou'd e'er be your Lot,  
 You're sure to be blest'd in a Palace or Cot;  
 O take the dear Man, without Fear, to your Arms,  
 And make him unspeakably blest in your Charms.  
 But Parents, perhaps, with their *Maxims* and *Rules*,  
 May rashly pronounce you a Couple of Fools,  
 If he is not possess'd of a splendid Estate,  
 To mimic the empty *Parade* of the *Great*.  
 I counsel you not to condemn their Advice,  
 But do not be forc'd from the Man of your Choice;  
 What tho' he be poor, yet it must be confess'd,  
 That you with Affection and Health may be blest'd!  
 It surely is best for avoiding all Strife,  
 That *Children* should chuse their own *Partners* for Life;  
 For surely the *Mis'ry* to all would be great,  
 Were they ty'd for their Lives to a Person they hate.  
 But Love, real Love, ev'ry Strife can restrain,  
 Enliven the Heart, and remove ev'ry Pain.

'Twill

'Twill make you partake of *ineffable* Blifs !  
 When e'er you receive the soft *conjugal* Kifs.  
 Now, lovely *Myrtilla*, my sensible Friend,  
 I hope you'll regard the few *Hints* I have penn'd ;  
 May Heav'n propitious your Conduct approve,  
 And give, for a *Husband*, the Person you love !

The PRIZE-ÆNIGMA answered by Celebs, of Westby.  
 AS SNUFFERS put out drooping Light,  
 Or make it brighter shine ;  
 So Death brings Man to endless Night,  
 Or endless Joys divine !

The PRIZE-ÆNIGMA answered by Mr. Thomas Smith, Lamberhurst, Kent.

1. AS I and *Bet* together sat,  
 And talk'd of *this* and then of *that*,  
 To pass away the Time,  
 I on *Palladium* cast my Eyes ;  
 Says I, let's read and find the Prize,  
 And answer it in Rhime.
2. The *Ænigma* I read o'er and o'er,  
 And on the same sometimes did pore,  
 Which made my *Charmer* pout ;  
 Lend me the SNUFFERS then, she said,  
 You cannot see, I am afraid,  
 And, for the Purpose, snuff'd the Candle out.

The PRIZE-ÆNIGMA answered by Mr. William Pen, of Chalfont, Bucks.  
 FOR two Years past you have dealt in Candle and in Candlestick,  
 In this Year you in SNUFFERS deal—to snuff the Wick :  
 The Prize last Year was filch'd by *David Small* ;  
 The next Year's Prize should be a good *Save-All*.

The same answered by Mr. Rowe of Cornwall.  
 TIME still holds forth his SNUFFERS widely spread,  
 Of human Life to cut the slender Thread.

The Rev. Thomas Vaughan, M. A. Morpeth, answered all the Ænigmas in Verse. Mr. John Needham, of Sheephead, Leicestershire, answered some of the Ænigmas in Verse. Mr. Stephen Hartley answered all in Verse ; as did Mr. Thomas Wood, of Stekegolding, Leicestershire ; Mrs. Mary Thomas, of Huntingdon ; Mr. William Pen, of Chalfont, answered most of the Ænigmas in Prose. Mr. William Marsden, of Netherhurst, Derbyshire, answered all but 10. Mr. Jonathan France, all but 10. Mr. Joseph Denton, of Hollymore, all the Ænigmas. Mr. William Turner answered 1, 4, 5, 7, 9 Ænigmas versified. Mr. William Spalton, all but 5. Mr. J. Hunt, answered the Prize versified ; as did Mr. Nicholas Wood, of Banstead, Surry. Mr. John Heath, of Harecott, answered 1, 4, 7, 8, 9, 10, Prize. Mr. Rd. Batho, of Tilstock, near Whitechurch, Shropshire, 1, 4, 5, 6, 7, 8, 9, and Prize. Mr. George France, of Wormhill School, answered all but the 10th. Mr. Joseph James, of Stoke Bishop, answered most of the Ænigmas in Verse, including the Prize. Mr. Jonathan France answered all the Ænigmas. Mr. Dutton, of Kingsley, Cheshire, answered all but 5 in Verse. Mr. Swift answered all in Verse.

## ANSWERS to all the QUERIES in last Year's PALLADIUM.

I. QUERE 246, answered by Mr. Thomas Stuchfield, Stepney.

THE Jewish Doctors are all of opinion, that *Melchizedeck* was *Shem*, the Son of *Noah*, from whom the *Messiah* was to spring; but *St. Paul* saith, that he was without *Father* or *Mother*; which therefore could not be applied to any human Person. Most of the *Christian* Fathers believed (and I think all our Divines are agreed) that he was *Christ*, who condescended to come down from Heaven in human Shape, to bless *Abraham*: if so, the mysterious Passage, alluded to, is at once unravelled.

Mr. *Joseph James* answered it in a similar Manner.

Mr. *Stephen Hartley* observes, that in *Hebrews*, Ch. vii. 3. is said, that *Melchizedeck* was without *Father* and *Mother*, *Descent* or *Beginning* of *Days*, or *End* of *Life*. Again in *Gen.* Chap. v. 5 we read that *Adam* (who was without *Descent*) died. *Melchizedeck* therefore was not of the Race of *Adam*, but an immortal Being. Hence, if his Body was of a corporeal Substance, it was of such a Nature as we Mortals have no Idea of; therefore we neither know how *Melchizedeck* came upon Earth, nor how or when he went from it.—*M. Dutton* says as much.

This Query has been resolved as follows—A young Clergyman who went to be examined by the Bishop, who had a good Living in his Gift, and being asked who was *Melchizedeck's* Father, he (after other Solicitors had applied for the Benefice before him, in vain) desired a little time to consider of it, and he would satisfy his Lordship's Question, in every Particular.—He went Home, and brought back two Letters handsomely folded and sealed up, containing different Bank Notes, and presenting the two Letters respectfully to his Lordship, said to him, this is an Account of *Melchizedeck's* Father, and this of his Mother. The Bishop then going aside to examine the Contents, unsealed the Letters, and found a satisfactory Answer. He then came to the young Clergyman, and told him, that he had well answered the Question; and therefore he should have the Living, as a Reward for his great Studies.

PAL. AUTHOR.

II. QUERE 247, conjectured by Mr. Stuchfield of Stepney.

AGREEABLE to the general Opinion, the Custom of making *April Fools* arose from that remarkable, but foul Stratagem, recorded in the *Roman History*, respecting the Ludicrous, but taking-in Trap, set for the *Sabine Women*, and at that Time put in execution.—Query, when this Liberty was taken by Authority, whether they thought themselves trapped, or thought they trapped the Trappers, instead of being made Fools, with their Eyes open, and their Trappers tolerated, by an Act of Toleration.

Mr. *Joseph James* answered the same.

Mr. *Alex. Rowe* assigns the *Cuckow*, coming forth about this Time, making Fools of their own Species; and cuckowing them, by laying in other Birds Nests, for the Original of making *April Fools*. It is certain that many have been fooled by being cuckowed; which is worse than playing an *April Fool's* Trick by another.

III. QUERE 248, answered by Mr. William Turner, Master of a Boarding School at Witney, Oxfordshire.

*Cleopatra* was an Egyptian Queen, Sister and Wife to *Ptolemy* the 13th. She was first assisted by *Julius Caesar*, to whom she bore a son, called *Cæsarion*.

Afterwards



Afterwards *Mark Anthony* kept her Company, quitting *Augustus*, his Partner's Sister, to whom he had been married before; which Treatment *Augustus* resenting, called him to account for it, and in a Sea-Fight, at *Adium*, having routed him, and driven him to Despair, he killed himself. This Lady taking example by him, clapt two poisonous *Asps* to her Breasts, and so died.—Mr. *Dutton* answered it in a similar Way.

Mr. *Antrobus*, of *Denbeigh, N. Wales*, has given us a curious Account of the Properties of the *Asp* by which *Cleopatra* poisoned herself, to avoid the Resentment of the Conqueror, *Augustus*; but as we shall take Notice of surprising Animals in the Countries, we shall hereafter describe in our *Geography continued*, in their proper Places, we omit inserting Mr. *P. Antrobus's* Account of the *Asp* here. Mr. *Alex. Rowe* answered this *Quere* to the same Purpose, to Mr. *W. Turner*; giving a very distinct Account of the poisonous Quality of the *Asp*. We have some *Asps* among us at this Day, poisoning with their Breath.

#### IV. QUERE 249, answered by P. Antrobus.

THAT Springs are hotter in Winter than other Waters, is evident; and the Reason is, that other Waters are exposed to the Cold and open Air; but Springs running through the Bowels of the Earth (*sometimes very deep*) are preserved from the Power of the Cold. Hence it is usual for Fish, in the Winter Season, to betake themselves to the deepest Waters, where they are furthest from the Extremity of Cold.

Mr. *Stephen Hartley* doubting the Propriety of the foregoing *Quere*, does not consider that the severest Frost penetrates but a few Yards into the Earth's Surface; by which it is evident, that the deeper we go in the Earth, where the Springs flow, the warmer it will be found; as it is warmer in Caves under Ground, than on the Earth's Surface. He observes that Experiments will prove the Fact, in the Degrees of Cold, by plunging a Thermometer into the same Spring at different Seasons of the Year. Mr. *Thomas Smith*, of *Lamberhurst, Kent*, observes the same.

Mr. *Alex. Rowe* answers to the same Purpose; as did Mr. *Joseph James*, Mr. *Dutton*, and others.

#### V. QUERE 250, answered by Mr. Isaac Gumley, of Countesthorpe.

I think, Mr. *Swift*, many more besides me  
Will own that the *Doctors* are pleased with a *Fee*.

Mr. *William Swift*, the Proposer's Answer.

Physicians are well pleased, can't be denied,  
When they are well, and most Men sick beside.

Mr. *John Needham* answered it to the same Purpose; as did Mr. *Thomas Robinson*, of *Biddick*; Mr. *Stephen Hartley*; Mr. *Joseph James*, and several others. *Observer* says,

*Doctors* and *Lawyers* gladly take their *Fee*,  
When the *Most* are sick, or the *Most* disagree.

#### VI. QUERE 251, answered by Mr. Thomas Rolinson, of Bidlick.

In Mr. *Samuel Humphrey's* Annotations on 5th Chap. *Genesis*, he says,  
"It is naturally supposed, that the Chief cause of Longevity of Men, in former Times, was the salubrious Constitution of the Antediluvian Air, which after *Noah's* Flood is supposed to become corrupt and unwholesome at particular Seasons; breaking, by Degrees, the original good Temperament of the Body, and shortening Men's Lives, in a few Ages, to nearly the present Period."

Mr.

Mr. P. Antrobus sent us an elegant *Latin* Answer to the foregoing *Quere*, which we have not room for. It is much to the Purpose of the foregoing Answer; but more particular and expressive of the different Opinions and Causes of *Longevity* before the Flood.

Mr. Suchfield, of Stepney, says, that a learned Commentator has these Observations on the *Longevity* of Men before the Flood—"Reflecting on the Death of Adam, here (says he) we have an Account of the long Life of Adam, the first Man that was created. It seems to be very consistent with the Divine Wisdom, that he should live till he had fulfilled the Divine Command, in multiplying his Posterity upon Earth. It has been said, that these Years were no more than *Lunar* ones, or *Months*, according to that Account, some of the antediluvian *Patriarchs* must have had Children before they were six Years of Age. In the 6th Chapter of *Genesis*, and 3d Verse, it is declared, that the Days of Man shall be an Hundred and Twenty Years. And it may be observed, that the Increase and Wickedness of Men is another Reason for shortening their Duration."

Mr. Alex. Rowe observes, that if Men lived the Term of Years they first did live, that the Produce of the Earth would not suffice for their Increase in Food and Cloathing.

Mr. Thomas Robinson thinks the Cause of *Longevity*, before the Flood, to be a purer Air than in these Days; uncorrupting the Blood and Constitution of Men.

Mr. Joseph James observes, that, notwithstanding modern Luxury, Men now live nearly to the same Age, as they did in the Days of David, and the Prophets of old.—That the *Longevity* was chiefly confined to the *Patriarchs* from Adam to Noah. After which the Years of Man were numbered to 120 Years.—Jacob lived to 147, and Sarah 127 Years, Eli (the 11th Judge of Israel) to 98 Years. But the Prophet Samuel lived to 78, David to 70, and Solomon to 68 Years only; yet we are told, that David died in a good old Age full of Days, Riches, and Honour. Which Years are but little short of the former Age allotted to Man of 120 Years.

Mr. Dutton, of Kingsley, Cheshire, answered it in a similar Manner.

#### ANSWERS to the REBUSES in last Year's PALLADIUM.

- |                         |                |                  |
|-------------------------|----------------|------------------|
| I. KILFORTH, unlimited. | III. ELY.      | V. UNLIMITED.    |
| II. TIME.               | IV. A PEACOCK. | VI. CHESTERFIED. |
|                         |                | VII. WENTWORTH.  |

All but 1st and 5th *Rebus* were answered by Mr. William Marsden, Mr. Joseph Denton answered most *Rebuses*; as did Mr. William Spalton. Mr. John Heath of Harcott, and Mr. John Needham, answered 4, 6. Mr. Hareje 2, 3, 4, 6, 7; Mr. Smith of Netherburst, Kent, answered 2, 3, 6, 7; Mr. Jonathan France, the same, and 4; Mr. Swift, most *Rebuses*.

II. *Rebus*, answered by Mr. John Packer.

Time, when transpos'd, a Mite will shew;  
For *Pbillis'* Fortune now comes due.

The Proposer sent no Answer to the 1st *Rebus* that we cannot find.

Mr. William Pen answered 3, 4, 6, and 7 *Rebuses*; Mr. Geo. France, 2, 3, 4, 6; Mr. Jos. James answered most of the *Rebuses* in Verse.

Mr. Isaac Gumley answered the 2d, 3d, 6th, and 7th *Rebuses*.

Miss Newton ev'ry Heart wou'd smite,	7
Was she possess'd of ne'er a Mite;	2
The Swans of Chesterfield and Ely	6, 3
Resign for her divine Amely:	
All celebrate her pow'rful Charms,	
And long to clasp her in their Arms!	

The Rev'd Thomas Vaughan, A. M. of Morpeth, answered them as follows:

Little Hale, Wentworth, Peacock, Chesterfield, Ely, Mite,  
All the *Rebuses* answer'd but one—if I am but right.

### ANSWERS to the PARADOXES in last Year's PALLADIUM.

I. PARADOX answered by Mr. Thomas Smith of Lamberhurst, Kent.

One Inch being cut off from a cylindrical Pin of One Inch Diameter, it will exactly fill a square Space of One superficial Inch, being put therein Sideways, or with the convex Part into that Space.

Mr. P. Antrobus answers it the same; only he directs the cutting the Segment of the Cylinder, an Inch long, through the Middle of the Axis, to make the square Form of each Piece, filling up the square Space, appear.

Mr. William Pen says,

If th' Length and Diameter both equal are,  
It will fill up a Circle and also a Square.

Mr. William Marsden, and Mr. Richard Batbo, answered this deep and dark Paradox.

Mr. Isaac Gumley's Answer, addressed to Miss Stow, the Proposer.

Let the Length of the Pin, to conform to your Riddle,  
Be an Inch and no more, and then split down the Middle;  
The Section will be just the Square of an Inch,  
To fill your Quadrangular Space at a Pinch.

II. PARADOX answered by *Analyticus*.

Let  $x$  = any whole Number, Decimal or Vulgar Fraction; and  $x$  = Number sought, whose Log. = 0, correctly.

Then,  $1 \times 1 = 1 = 1^x$  its Product, Power, and Root } = Unity.

And,  $1^{\frac{1}{0}} = 1 = 0^0$  its Nothing Root, its own Power, Nought Power of [Nought, respectively.

N. B.  $\pounds.0 + \pounds.0 = \pounds.1 \times 1 = \pounds.0, \times x = \pounds.0, \times \frac{1}{x}$  } =  $\pounds.0$ , whose  $N^0$  respectively = 1, as above.

And,  $\pounds.0, \times \frac{1}{0} = \pounds.0 \times 1 = \pounds.0, \times 0$



N. B. If  $x =$  an infinitely great, then  $\frac{1}{x} = 0, = \mathcal{L}.0, = \mathcal{L}.0$  of an infinitely great Number (for  $\mathcal{L}.x =$  an infinitely (or rather indefinitely) great Negative Number  $= \mathcal{L}.0$ . Also  $\frac{1}{0} =$  an infinitely great  $N^{\circ}$ . So that  $\mathcal{L}.1 = \mathcal{L}.0 = 0, =$  an infinitely great Negative  $=$  an infinitely great Affirmative Logarithm, whose  $N^{\circ} = \frac{1}{0} =$  an infinitely great Number, as before; or rather an indefinitely great Number, to distinguish the Degrees of Infinite Quantities, like the 1st, 2d, 3d, &c. Degrees, or Ratios of Fluxions, deduced from different infinitely small Quantities; which, properly speaking, are different small Indefinites. Such is this wonderful Doctrine of Infinites from the Properties of Unity, and its Log. 0, which some Mathematicians will have to be an indefinitely small Quantity, though expressed by 0.

Mr. Stephen Hartley answered this Paradox by Unity; as did Mr. J. Hunt. Mr. W. Pen, by 1 or 0; Mr. Marsden, by 1; Mr. J. Jeph Denton, by 0; Mr. Michael Wood, and Mr. Richard Batbo, by 1.

Mr. Isaac Gumley observes thus:

From your Paradox—all I've been able to glean  
Is Nothing †, and Nothing you certainly mean. † Cypher, or 1.

Mr. Stephen Hartley observes thus:

The Answer to the 3d, I think may be  
The Logarithm of One, 0, or Unity.

III. PARADOX, answered by Mr. John Needham of Sheepstead, Leicestershire.

Two is equal to 2,  
Take Tw away, then 0 remains, will do.

N. B. Tw, this Correspondent makes  $=$  Two-thirds of 2.

Mr. W. Marsden answered it in the same demonstrative Way.

Mr. Swift sets down 110 for Answer, and bids you take away Two Thirds of the Figures (viz. 11) when 0 remains—so any other Number of Figures with a Cypher annexed, being taken from the Cypher, will be as sufficient as any or all of these Answers to this profound Paradox.

The Rev'd Thomas Vaughan, A. M. of Morpeth, answers it by a new Method, still an Improvement on all former Improvements:

Take  $n$  and  $e$  from one, 'tis plain,  
Nought but a Cypher, or 0, will remain.

IV. PARADOX answered by Mr. Stephen Hartley of Sowerby Bridge.

By the Rules of astronomical Authors, I find, that Easter-Day fell, in 1776, upon Palm-Sunday, according to Old Style. By the same Rules I find, that, in the Year 1780, Easter will fall Six Weeks from the Roman Palm-Sunday, N. S.

The Proposer answered the above Question in a similar Manner, according to Old and New Style; though by his Neglect of sending his Answer this Year (the last Year's Answer not being kept) we are unable to assign what it was; but remember the Similarity.

V. PARADOX answered by Mr. Thomas Robinson of Biddick.

Miss Hill or Tayler you will find the same,  
So call'd from Miss Hill's Mother's Maiden Name :  
Own Sister to Mich. Taylor she is still ;  
Tho' Mich. has lately left sweet Marley Hill !

Observerwater observes thus :

When Miss Hill's Mother wed she chang'd her Name,  
And therefore Hill and Taylor's not the same ;  
For Mich. and she might have the self same Mother,  
Who married first to One and then Another :  
Would it be right to call another's Son,  
By the same Name with the fam'd Robinson ?

Answered by Mr. William Pen, Chalfont, Bucks.

Either Mich. Taylor or Miss Hill  
Was out of Wedlock born—be which it will :  
The Conqueror of Great Britain so was born,  
And therefore think it neither Shame or Scorn.

ANSWERS to the QUESTIONS in Last Year's PALLADIUM.

I. QUESTION 555, answered by Mr. Thomas Robinson, of Biddick.

$$\text{GIVEN } \left\{ \begin{array}{l} y \sqrt{x - \sqrt{y^3 - 10x}} = 380 = b \\ x \sqrt{x - xy^2} = 1500y = cy \end{array} \right\} \begin{array}{l} \text{Put } v^2 = x \\ \text{to find } x \text{ and } y? \end{array}$$

$$\text{Then } vy - \sqrt{y^3 - 10v^2} = b \\ v^3 - v^2 y^2 = cy. \text{ Th. } y^2 + \frac{cy}{v^2} = v.$$

$$\text{Comp. Sq. Whence, } y = v + \frac{c^2}{4v^4} - \frac{c}{2v^2}$$

$$\text{Then } vy - b = \sqrt{y^3 - 10v^2} \text{ Th. } v^2 y^2 - 2bvy + b^2 = y^3 - 10v^2 \\ \text{and } y^3 - v^2 y^2 + 2bvy = b^2 + 10v^2. \text{ In which put the Value of } y.$$

$$\text{We have } \left| \sqrt{v + \frac{c^2}{4v^4} - \frac{c}{2v^2}} \right|^3 = v^2 \times \left| \sqrt{v + \frac{c}{4v^2} - \frac{c}{2v^2}} \right|^2$$

$$+ 2bv^2 \times \sqrt{v + \frac{c^2}{4v^4} - \frac{c}{2v^2}} = b^2 + 10v^2. \text{ N. B. The above}$$

Equations are defective and require Correction : for which Reason the Numbers, seemingly intended for whole Numbers, cannot be determined : but should be sent by the Proposer, if they are not 16 and 5.

Mr. Thomas Watkins, of Bristol, judiciously makes the same Observation.  
—Other Correspondents make one of the Numbers negative.

II. QUESTION 556, answered by Mr. Joseph James, of Stoke Bishop:

PUT  $a = 100$ ,  $b = 10000$ ,  $x =$  greater part, and  $100 - x =$  Lesser,

and by Quest.  $\frac{x}{a-x} - \frac{a-x}{x} = b$ , whence  $x^2 - mx = 1$ , (where  $m = \frac{2a}{b} -$

a) and Comp. Sq. we have, after Extraction,  $x = \sqrt{\frac{m^2}{4} + 1} + \frac{m}{2} =$

99990000999999 = Greater Number, and consequently  $a - x =$ ,  
0099990000001 = Lesser Number, required.

Mr. Robinson of Biddick, answered it by the same Method; as did Mr. William Marsden, of Netherhurst, Derbyshire; Mr. Ralph Taylor, of Oldham, near Manchester, Lancashire; Mr. Joseph Scot, Mr. Thomas Barrow, of Welton, South-cove, Yorkshire; Mr. Stephen Hartley, of Sowerby-bridge; Mr. Thomas Elliot, of Mythom-bridge; Mr. John Buckley, a Youth of Milnrow, near Rochdale, Lancashire; Mr. Thomas Watkins, of Bristol; Mr. John Parker, of Asby de la Zouch; Mr. William Ward, School-master, of Leicester. Mr. John Peck; Mr. R. Dutton; Mr. W. Gibson, of Tideswell, Derbyshire; Mr. W. Palmer, and Mr. Rich. Cue, at Mr. Finninley's School at Thorney, near Peterborough; Mr. T. Smith, of Hetherfel, Norfolk; Mr. Jos. Denton, of Holymore; Mr. Alex. Rowe; Mr. John Wright, of Aldborough; Mr. Jonathan France; Mr. Richard Batho; Mr. John Turner, of Witney, Oxfordsh.

[III. QUESTION 557, answered by Mr. Thomas Elliot, of Witham-Bridge, Derbyshire.

The 4 Mens daily Wages being 42, 45, 48, and 51 Pence, as 14, 15, 16 and 17, (dividing by 3) it is evident, that the Time they respectively took, to finish the working together will be as  $\frac{1}{14}$ ,  $\frac{1}{15}$ ,  $\frac{1}{16}$ , and  $\frac{1}{17}$ . Whence by Proportion, as the Sum of these Fractions  $\frac{749}{2880}$ .

$$\begin{array}{c} D \\ \text{Work : } 130 :: \left\{ \begin{array}{l} \frac{1}{14} : 35 \frac{588}{749}, A. \\ \frac{1}{15} : 33 \frac{749}{749}, B. \\ \frac{1}{16} : 31 \frac{749}{749}, C. \\ \frac{1}{17} : 29 \frac{749}{749}, D. \end{array} \right\} \text{worked.} \end{array}$$

30 Days, Proof.

N. B. The Number of Days each Man worked being multiplied into his respective Wages = 6l. 5s. 3d. 1q.  $\frac{749}{2880}$  each Man's Wages for the whole Work.

Mr. William Marsden, of Netherhurst, answers it in the same Manner and Numbers.

Mr. Thomas Barrow, of Welton School, Yorkshire; Mr. William Spalton, of Renishaw, near Chesterfield; Mr. Thomas Elliot, of Mythom-Bridge, Derbyshire, answered it; whose several Conclusions exactly correspond with, and confirm the Truth of the Answer above.

One Correspondent (considering the Wages that A, B, C, and D had a Day, being as 14, 15, 16, and 17) erroneously considered, that therefore A, B, C, and D, worked as 17, 16, 15, and 14 Days respectively, the Sum making 62 Days. Then proportioning, as 62 to 130, so 17, 16, 15, and 14 respectively, to 35  $\frac{19}{2}$ , 33  $\frac{24}{2}$ , 31  $\frac{28}{2}$ , 29  $\frac{22}{2}$  Days, that A, B, C, and D, respectively, worked. And  $35 \frac{19}{2} \times 3s. 6d. = 6l. 4s. 9d. \frac{4}{7} =$  each Workman's Wages: being a Rock we point out for others to avoid.

Mr.



Mr. *Joseph James* answered it, by proportioning from how many Days one Man worked more than another. Mr. *Robinson*, of *Biddick*, the same.

Mr. *Thomas Watkins*, of *Bristol*, observes, that this Question is superfluous; as not being limited, he says, to one Answer. Who first solves it by supposing the whole Number of Workmen, 4, constantly employed together for 130 Days, at the given Rates of Wages, What will they receive for one Day's Labour? Who gives this Rule—Multiply the Sum by the Time given, and divide by the Number of Workmen, the Quotient will be the Money each received for his whole Work,

$$\text{Thus, } \left\{ \begin{array}{l} 42 \\ 45 \\ 48 \\ 51 \end{array} \right\} \text{ D. } d. : 1 :: 6045 : \text{Time each worked } \left\{ \begin{array}{l} 143 \frac{1}{4}, \text{ A.} \\ 134 \frac{1}{2}, \text{ B.} \\ 125 \frac{1}{2}, \text{ C.} \\ 118 \frac{1}{4}, \text{ D.} \end{array} \right.$$

$$186 \times 130 = 6045 \text{ d. each received.}$$

4

*Quere*, How can the Sum of these Days make up 130 Days the Work was to be finished in? They can only make up 6045 Pence, whence they are derived, by contradictory Proportion to Words in the Question.

Mr. *Watkins* solves this Question afterwards by true Proportion; whose Conclusions exactly agree with the proper Solutions by others.

Mr. *John Peck*, of *Seggleshorpe*, answered it; as did Mr. *Thomas Smith*, of *Hertherset*.

Mr. *Watkins's* true Solution.—As  $\begin{array}{l} d. \text{ D. } 45 \\ 42 : 1 :: 48 \\ 51 \end{array}$  inversely : Time B, C, and D respectively require, proportionable to the Work A finishes in 1 Day, viz. A. 1, B.  $\frac{42}{45}$ , C.  $\frac{48}{45}$ , D.  $\frac{51}{45}$  of Work.

Hence 1, A.  $+\frac{42}{45}$ , B.  $+\frac{48}{45}$ , C.  $+\frac{51}{45}$ , D.  $= 1, +\frac{1}{15}, +\frac{1}{15}, +\frac{1}{15} = \frac{74}{75}$  whole Work done by A, B, C, D, working together, for 130 Days.

As  $\frac{74}{75}$  Work : 130 :: 1 Work :  $35 \frac{585}{7400}$ , A. } wrought Days,  
And 6l. 5s. 3d. 1q.  $\frac{3283}{7400}$  correct- }  
ly each Workman's Wages }  $\left\{ \begin{array}{l} 33 \frac{363}{7400}, \text{ B.} \\ 31 \frac{271}{7400}, \text{ C.} \\ 29 \frac{539}{7400}, \text{ D.} \end{array} \right.$  required.

130 Days, Proof.

IV. QUESTION 558, answered by the Proposer, Mr. *Joseph James*, of *Stoke-Bishop*, near *Bristol*.

1. TO find the Quantity each Person could drink in a Week, and the Time of emptying the Cask.

W. C. W. C.

As  $\frac{1}{2} : 1 :: 1 : 2$ , A. }  
 $\frac{1}{4} : 1 :: 1 : 1\frac{1}{2}$ , B. } Drank in a Week.  
1, C. }

Sum  $4\frac{1}{2}$  Casks drunk in a Week, by A, B, and C drinking together.  
Now put  $x$  = Part of a Week, when A. began drinking before the other two.

Then

W C W C

Then,  $\frac{1}{2} : 1 :: x : 2x =$  Quantity drunk by A in  $x$  Time of a Week.  
 Whence,  $1 - 2x =$  Quantity remaining when all Three began drinking together.

C W C

Wherefore,  $4\frac{1}{3} : 1 :: 1 - 2x : \frac{3-6x}{13} =$  Weeks all three were drinking together. To which adding  $x$ , and the Sum  $\frac{3+7x}{13} =$  Weeks A, B, and C were in drinking the whole Cask:

2. To find the Quantity each Person drank.

W C

$\frac{3}{4} : 1 :: \frac{3-6x}{13} : \frac{4-8x}{13} =$  Quantity drunk by B.

$1 : 1 :: \frac{3-6x}{13} : \frac{3-6x}{13} =$  Quantity drunk by C.

$\frac{1}{2} : 1 :: \frac{3-6x}{13} : \frac{6-12x}{13}$ , to which adding  $2x = \frac{6+14x}{13} =$  Quantity drunk by A.

Then,  $\frac{6+14x}{13} \times 4\frac{1}{3} = \frac{126+129x}{52} =$  Sum A paid.

And  $\frac{4-8x}{13} \times 5\frac{1}{4} = \frac{84-168x}{52} =$  Sum B paid.

And  $\frac{3-6x}{13} \times 5\frac{1}{4} = \frac{63-126x}{52} =$  Sum C paid.

But by Quest.  $\frac{126+129x}{52} - \frac{84-168x}{52} = \frac{1191}{208}$ ; whence  $x = \frac{1}{8}$  W D H M

Hours. Hence the Time of Drinking out the Cask, 2 2 4 $\frac{6}{13}$ ,

£.	s.	d.	q.	
3	2	7	0 $\frac{8}{13}$	A.
1	4	2	3 $\frac{1}{13}$	B.
0	18	2	0 $\frac{4}{13}$	C.

} paid for the Wine he drank.

5 5 0 0 Proof.

Mr. Isaac Rowbottom, of Westhallam, methodically and correctly answered this Question; as did Mr. Thomas Smith, of Hetherset.

Mr. Robinson, of Biddick, analytically answered it in the very same Numbers, as to Quantity drunk; but found no Time. Several erroneous and immethodical Answers were received, but no complete and methodized Answers, except the foregoing, came to hand. And we are amazed that Persons of Ability will not be at the Trouble to methodize their Answers, and work out the Numbers correctly, in order to compare with and confirm the Truth of each other, for want of which necessary Care and Diligence, all their Time is thrown away. Mr. Ralph Taylor, of Oldham near Manchester, answered it. Mr. John Parker, of Ashby de la Zouch, answered it in a masterly Manner; as did Mr. John Wright, of Aldbrough.

V. QUESTION

## V. QUESTION 559, answered by Mr. Isaac Rowbottom of Westhallam.

Let the Quotient, by 27 (the First of the given Divisors) be denoted by  $x$ , then, by proceeding according to known Methods, we shall get  $\frac{9x+8}{7} + x = a$  whole Number; whence the least Value of  $x = 1$ . Therefore, the least Number that will satisfy the Three First Conditions of the Quest. will be found  $= 914$ . Now, let the least Number, which is exactly divisible by 27, 23, and 17, be assumed; which, because they are Primes to each other, will be  $27 \times 23 \times 17 = 10557$ ; whence, the required Number will be denoted by  $10557x + 914$ : Therefore,  $\frac{10557x + 914 - 11}{13}$  must be a whole Number; from whence the least Value of  $x = 7$ ; consequently,  $10557x + 914 = 74813$ , the Number. — W. W. R.

Mr. Thomas Barrow of Welton School, near South Cave, Yorkshire, answered it thus:

Let the Number be expressed by  $27x + 23$ , then  $\frac{27x+23-17}{23}$  or its Equal,  $x + \frac{4x+6}{23}$  must be a whole Number. From whence, the least Value of  $x$  will be found  $= 10$ ; and consequently, the Number answering the Two First Conditions of the Question will be 293. Now, the least Number which is exactly divisible by both the said Divisors, 27 and 23, is  $= 27 \times 23$  (because they are Primes to each other)  $= 621$ . Hence,  $\frac{621+293-13}{17}$ , or its Equal,  $36x + 16 + \frac{9x+8}{17}$  will be a whole Number likewise; and here the least Value of  $x$  is  $= 1$ . By proceeding as above, the Number required will be truly expressed by  $812x + 69 + \frac{x+6}{13}$  a whole Number, being 74813. — W. W. R. Plaudite!

Mr. Thomas Elliot of Mytton Bridge, Derbyshire, ingeniously answered the same; as did Mr. Joseph James, by another elegant and correct Process; also Mr. Robinson of Biddick.

Mr. Thomas Watkins of Bristol answered it by another Method.

Mr. Scot wrought out the same Number; as did Mr. John Peck, Mr. Wm. Penn, Mr. Thomas Smith, Mr. Denton, Mr. Alexander Rowe, Mr. John Wright of Aldbrough, Mr. John Shadgett of Ross, Oxfordshire, which last Solution came too late for further Notice.

## VI. QUESTION 560, shortly and truly answered by Mr. Isaac Rowbottom of Westhallam.

It is well known, that the Diameter of the given Circle will be the Diagonal of its inscribed Square: Theref.  $\frac{\sqrt{121^2}}{2} = 6\sqrt{2} = 8.485281372$

the Side of the Square, and  $\frac{6\sqrt{2}}{\sqrt{3854}} = 9.5746$ , the Diameter of the Circle.

W. W. R.

Mr.



Mr. *Weston* of *Chester* finds the Answer the same.

Mr. *Thomas Elliot*, by a similar Method, finds 9.573 Inches, the Diameter of the Circle. Mr. *Robinson* finds it, shortly, 9.57, &c. as did Mr. *Scott*. But Mr. *Thomas Elliot*, by another Method, inscribing a Circle at the End of a Square, and both in a Circle, finds the Diameter = 6.029, &c.

Mr. *Thomas Barrow* of *Welton* School, by the same Method, finds the Diameter 6.0275, &c. but Mr. *Joseph James* finds it 6.029166 and 5.343209 the Side of said Square, inscribed with the said Circle at the End thereof in another Circle. Mr. *Watkins* of *Bristol* finds the inscribed Circle's Diameter 6.0291709. Mr. *William Hedley* of *Cambo, Northumberland*, finds the Answer like Mr. *Rowbottom*, 9.5749, the required Diameters. Mr. *John Peck* finds the Diameter 6.0257, &c. Mr. *Palmer* and *Cue*, 9.574, &c. Mr. *Penn*, Diam. 9.5746, &c. Mr. *Denton*, 9.5746. Mr. *Alexander Rowe*, ditto. Mr. *John Wright* of *Aldbrough*, 6.029. Mr. *Richard Batbo*, 10.86, &c. Mr. *Jonathan France*, 5.317.

#### VII. QUESTION 561, answered by Mr. Rowbottom of Westhallam.

Let the Difference of the Height of the Rocks be denoted by  $x$ ; 130 Feet by  $a$ ; and the nat. Tang. of the given Angle by  $t$ ; then  $\frac{x}{t} =$  the Breadth of

the Channel. Therefore,  $\sqrt{a+x} \frac{t^2 + x^2}{t^2} - \sqrt{a^2 + \frac{x^2}{t^2}} = 40.9376$ , by

Quest. from which Equation  $x$  is found = 57.120538. Therefore the highest Rock is 187.120538 Yards; the Length of the Rope is 163.3167, and the Breadth of the Channel is 153 Yards, nearly. W. W. R.

Mr. *John Buckley*, a Youth of *Milnrow*, near *Rochdale*, solves it literally and by Trigonometry, whose Numbers wrought out confirm the above Solution.

Mr. *Joseph James* sends a Correction to his Numbers, as follows:

He thought to have given the Height of the lower Rock, 134 Yards; from whence he brought out the Breadth of the Channel, 150 Yards, the higher Rock, 190 Yards, and the Length of the Hawser, 160.1124 Yards; but from the printed Breadth of the Channel = 153.0029 Yards, the higher Rock, 187.1209 Yards, and the Length of the Hawser, 163.3177 Yards, agreeing with the above Solutions.

Mr. *Thomas Barrow* of *Welton* School, near *South Cave, Yorkshire*, confirms the same Numbers, by his accurate Method of Solution.

Mr. *Stephen Hartley*'s Solution comes near; Mr. *Rowe*'s correctly, who is a good Proof-Operator; but writes when others Solutions are compiled.

Mr. *Tho. Elliot* of *Mythom Bridge* finds the Channel's Breadth 153.0027, the higher Rock, 187.12087, Length of the Rope, 163.318 Yards. Mr. *Watkins*'s Numbers agree with the above; as do Mr. *Ralph Taylor*'s of *Oldham*, near *Manchester*, very correctly.

Mr. *Spalton* wrought out no Numbers; and therefore his Solution cannot be compared and proved.



finding the Area of a *Parallelogram*, or One Side of the *augmented Square*, evidently = half an Acre, in Square Links, —  $\frac{1}{2}$  Square Link = 50000 —  $\frac{1}{2}$  = 49990  $\frac{1}{2}$  Square Links; and (1 Link being the Breadth) therefore = Links in the Side of the required Square (without *Substitution*) as before. *Plaudite!*

Mr. *Ralph Taylor* of *Oldham*, near *Manchester*, correctly answered it; as did Mr. *John Baker* of *Asby de la Zouch*, Mr. *John Peck*, Mr. *Palmer* and *Cue*, Mr. *T. Smith*, Mr. *Dutton*, Mr. *W. Gibson*, *Nauticus*, Mr. *Denton*, Mr. *Alexander Rowe*, Mr. *John Wright* of *Aldbrough*, Mr. *Richard Batho*, Mr. *Jonathan France*, and Mr. *Shadjet* of *Ross*, *Herefordshire*.

X. QUESTION 564, answered by Mr. Joseph James of Stoke Bishop, near Bristol.

Since the *Cone* is oblique, the *Base* must be *elliptical*.

Put  $a = 104$  Feet,  $t = 5\frac{1}{8}$  Seconds,  $d = 16\frac{1}{12}$  Feet,  $p = ,7854$  and  $x =$  Time of *perpendicular Descent*, then  $t + x =$  Time of Descent thro' the longer *slant Side*. And, by the Laws of Gravity,  $1^s: x^2: d: dx^2 =$  the *Cone's* Altitude. And  $x: t + x :: dx^2: dx \times t + x =$  longer *slant Side*, also (by 47. e 1)  $d^2 x^2 \times t + x^2 - d^2 x^4 =$  Square of *Radius* of the *Cone's* Base. By *Mensuration*,  $\frac{2}{3} \times a p d x^2 \times \sqrt{2 t d^2 x^3 + t^2 d^2 x^3} =$  Solidity; which put into *Fluxions*, and reduced  $x = \frac{2}{3} = .42857$ ; whence the Solidity = 3465.3275 Feet. W. W. R.

XI. QUESTION 565, answered by Mr. Isaac Rowbottom of Westhallam.

*First.* Suppose a *Pendulum* to make  $b$  Vibrations in  $c$  Seconds of Time. Put  $x =$  Length of the required *Pendulum*. By *Mechanics*,  $\sqrt{a}: \sqrt{x} :: c \div b: c \sqrt{x} \div b \sqrt{a} =$  Time of One Vibration of a *Pendulum*  $x$  long. Whence, by the *Question*  $c \sqrt{x} \times \sqrt[3]{x^2} \div b \sqrt{a} = 60s$ , which, when  $a =$  the Second *Pendulum*, becomes  $\sqrt{x} \times \sqrt[3]{x^2} \div \sqrt{a} = 60s$ , or  $60 \sqrt[4]{a} = x^{\frac{7}{8}}$ . Therefore,  $\text{Log. } 60 \sqrt[4]{a} \div \frac{7}{8} = \text{Log. } x = 2.2069664$ , and  $x = 161.0522$  Inches.

*Secondly.* There is given  $x^{\frac{1}{x}}$  a *Maximum* to find  $x$ ? Put  $v =$  Hyper. Log.  $x$ , then will  $\frac{v}{x}$  be a *Maximum*; or Log.  $v - vx$  is a *Maximum*. Its Fluxion  $\frac{\dot{v}}{v} - \dot{v} x - v \dot{x} = 0$ : Whence, by substituting  $\frac{\dot{x}}{x}$  for  $\dot{v}$ , we shall have  $\frac{\dot{x}}{vx} - \dot{x} - \dot{v} x = 0$ , or  $v^2 x + vx = 1$ . This Equation may be solved by a few *Trials* and a Table of Logarithms, when  $x$  will come out = 1.55913 Inches nearly. Then he proceeds to find the Rest analytically by *Emerson's Fluxions*; viz. 6.86258, the Time lost in 24 Hours. — W. W. R.



No other Answer was given carrying *Probability* of Truth; which is always doubtful without being confirmed by Comparison, and Agreement with other Solutions.

XII. QUESTION 466, answered by Mr. Stephen Hartley of Sowerby Bridge.

Put Radius of the Earth = 4000 Miles = 21120000 Feet =  $a$ , 100 Feet =  $b$ ; then,  $\frac{a}{a+b} = .999952 = \text{Cos. Angle formed by the Earth's}$

Center, the Observer's Eye, and the Sun's upper Limb =  $10'.33''$ ; which gives the *Azimuthal* Difference in that Latitude =  $89^{\circ}.49'.30''$ . Therefore, by the Question's *Data*, and *Spherical Trig.* the Latitude of the Place is found to be  $74^{\circ}.48' \text{ N.} - W. W. R.$

Mr. Alexander Rowe's Solution,  $74^{\circ}$ , &c. Lat. confirms the above Truth.

Mr. James Lamb of Aldbrough, allowing 33' for the Sun's Refraction, finds 43°. 40" the Sun's Depression below the Horizon, and the Sun's Declination, at Midnight, May 4th, 1775, being 16°. 61'. 17", whence,  $90^\circ - 16^\circ. 61'. 17'' + 43'. 40'' = 73^\circ. 10'. 3''$ , the required Latitude on those Principles.

XIII. QUESTION 567, answered by Mr. James Lamb of Aldbrough, near Hull.

Given  $CB = 26$ ,  $BD = 12$ ,  $CP = 15.5$ , whence,

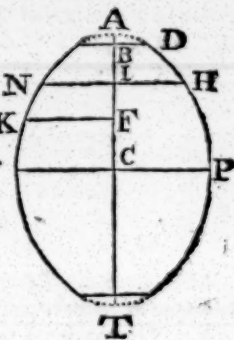
by the Prop. of the Ellip.  $\sqrt{C P^2 - B D^2} : C B ::$   
 $CB \times CP$  D

$$CP : CA = \frac{CB \times CP}{\sqrt{CP^2 - BD^2}} = 41.077 = a. \text{ Put } K$$

CP =  $c$ ,  $n = .7854$ ,  $x = CI$ ,  $\frac{1}{2}$  Length of Cy-  
linder, then  $a - x = AI$ , and  $a + x = TI$ . Then,  
by the Prop. Ellip.  $a^2 : 4c^2 :: a + x \times a$ . Th.

$$NH^2 = \frac{4c^2a^2 - 4c^2x^2}{a^2}; \text{ which } \times d \text{ } 2x \times n =$$

Cont. Cylinder, a *Maximum*.



In Flux,  $8c^2a^2\dot{x} - 24c^2x^2\dot{x} = 0$ ; whence  $x = a\sqrt{\frac{1}{3}} = 23.71375$   
 $=$  CI, which doubled  $47.4275$  Length of Cy'linder. And  $2c\sqrt{\frac{2}{3}} = 25.3112$   
 Inches, its Diameter.

Again, Let  $CF = \frac{1}{2}$  Length of the Cube, F the Center of its Face, then will FK be the Hypotb. of right-angled  $\Delta$ ; and FC one of its equal Legs; whence  $KF^2 = 2 FC^2$ . By Ellip.  $CA^2 : CP^2 :: CA^2 - CF^2 : FK^2$  or

$$2CF^2. \text{ Whence, } \sqrt{2CA^2 + CF^2} : CF :: CA : CF = \sqrt{\frac{CA \times CP}{2CA^2 + CP^2}}$$

$\approx 10.58949$ . Then, 21.17898 Inches  $\approx$  Side *Cube*.—*W. W. R.*

Mr. William Hedley at Cambo, Northumberland, answered the same in a similar Manner, by a curious Process and correct Numbers.

Mr. *Stephen Hartley* ingeniously answered it by a Process 41.08 Inches = Transf. Diam. Side of the Cube 23.7176 by Fluxions. Mr. *Robinson* makes the Transf. Axis = 82.154 Inches, Cylinder's Length 47.432, and Diam. 25.155, and Side of the inscribed Cube 29.006. Mr. *Jonathan France* answered the same by an analytical and fluxional Process. Mr. *Rowbottom* answered it; as did Mr. *Jos. Scott*, and Mr. *Jonathan France*.

XIV. QUESTION 568, answered by Mr. Isaac Rowbottom.

Let a Semicircle's Radius = 1, then by *sim.* Arcs, as 100 (Rad. given Circle) : 140 (given Arch) :: 1 Rad :  $\frac{7}{2}$  Arch Corref. Now, let Four Arches be *sim.* to the required ones; and denote the Sines of the said Arches, and reduce them to an Expression of a Maximum.

It is shewn, at p. 179. *Emerf. Flux.* that when the said Expression is a Maximum, the Tangents of the Arches will be respectively as the Indices of the Powers of the Sines, viz. 1, 2, 3, 4, &c. Therefore, in this Case, let the Tangent of given Arch =  $t$ , then (by Prop. 8. Book 1. *Emer. Trig.*) as  $1^2 - 2x^3 : 1^2 :: 1 + 2 \times x : 3x \div 1 - 2x^2 = \text{Tang. 1st. Arch.}$  And as  $1^2 - 3x \times 3x \div 1 - 2x^2 : 1^2 :: 3x + 3x \div 1 - 2x^2 : 2 - x^3 \times 6 \div 1 - 11x^2 = \text{Tang. of 2d Arch;}$  and as  $1^2 - x - x^3 \times 24x \div 1 - 11x^2 : 1^2 :: x - x^3 \times 6 = 1 - 11x^2 + 4x : 10x - 50x^3 \div 1 - 35x^2 + 24x^4 = \text{Tang. Arch} = t$ ; from whence  $x = .1495071988$  nat. Tang. given of Arch. Whence the Parts of the Arch are easily determined; viz.

$$\left. \begin{array}{r} 14.8407 \\ 29.0552 \\ 42.1623 \\ 53.8968 \end{array} \right\} \text{Parts nearly.}$$

Sum ——— 139.9550 Feet; Proof. — W.W.R.

Mr. *Alexander Rowe* gives nearly the same Numbers by Fluxions. Mr. *Robinson of Biddick* answered it.

Mr. *Thomas Smith* of *Hetherfet* finds the 1st Arch = 14.8465  
2d ——— 29.0666

From Ex. 14. *Max. Min. Emerf. Flux.* 3d ——— 42.1877  
2d Edit. it is demonstrated, that the Tan- 4th ——— 53.9143

gents of the reduced Arches are the In-

dices of the Powers, 1, 2, 3, 4. Whence, 140.0151 Proof.  
the given Arch of 140 Inches = 80°.214 nearly; the Tangent of which = 5.79936 (Rad. = 1). Let Tangents 1, 2, 3, 4 Arches be  $x, 2x, 3x, 4x$ .

By Trig. Tang. Sum 1st and 2d =  $\frac{3x}{1-2x^2}$  Tang. Sum 1st, 2d, and 3d

Arches, =  $\frac{6x - 6x^3}{1 - 11x^2}$  and Tan. Sum 1, 2, 3, and 4th =  $\frac{10x - 50x^3}{1 - 35x^2 + 24x^4}$

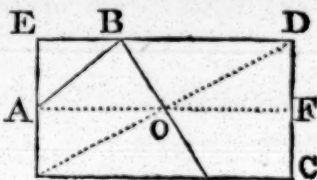
= 5.79936; whence, by Trial and Error,  $x = .149566$  very nearly. Conf. the Tangents of the reduced Arches are .149566; .299132; .448678; .598264, respectively; whose corresponding Degrees are 8°.30', 387; 16°.39', 218; 24°.9', 94; 30°.53', 435. Then, by Proportion, the Arches are respectively, as above. — W.W.R.

It

It was answered by *Nauticus* of *Stockton upon Tees*, and *Mr. Lamb* of *Aldbrough*.

XV. QUESTION 569, answered by *Mr. James Lamb*, *Aldbrough*.

Put  $a = OB = 75$ ,  $b = AB = 130$ ,  $x = DO$ ,  $y = BD$  By *sim. Δs.*  $DBO$ ,  $DOF$ , as  $y$



$a :: x :: \frac{ax}{y} = DF = AE$ ; and  $y : a :: x :$

$\frac{x^2}{y} = FO$ , and  $\frac{x^2}{y} \times 2 = AF$  or  $DE$ .  $\frac{2x^2}{y}$

$y = EB$ ;  $EB^2 + AE^2 = AB^2$ , viz.  $\frac{4x^4 - 4x^2y^2 + y^2 + a^2x^2}{y^2} = b^2$ ;

and  $BD^2 = BO^2 + DO^2$ , or  $y^2 = a^2 + x^2$ ; which Value of  $y^2$  put in last Equation and reduced  $x^4 - a^2x^2 - b^2x^2 = b^2a^2 - a^4$  (putting  $x = -a^2 - b^2$ ) then  $x^4 - 2cx^2 = b^2a^2 - a^4$ . Whence  $x =$

$\sqrt{c + \sqrt{c^2 + b^2a^2 + a^4}} = 158.29$ . Whence  $y = 175 : 16$ . Ther.  $ED = 286.09$   $DC = 135.55$  and Area 38779.5 Yards. — *W. W. R.*

*Mr. Rowbottom* answered the same in a similar and correct Manner.

*Mr. Thomas Robinson* answered it; as did *Mr. Stephen Hartley*, *Mr. Thomas Barrow* of *Welton School*, *Mr. John Buckley* of *Milnrow*, near *Rockdale*, *Mr. Ralph Thompson* of *Witberby Bridge*, *Mr. Thomas Elliot*, *Mr. Thomas Smith* of *Hetherfet*, *Mr. John Chipchase* of *Stockton*, *Durham*, *Mr. William Ward*, School-master of *Leicester*, and *Mr. John Wright* of *Aldbrough*.

XVI. QUESTION 570 answered by *Mr. Rowbottom*.

Put  $t$  and  $c$  for the Transverse and Conjugate Axes of the Ellipse; and let  $60 = a$ , then, by the Properties of that Curve, as  $t : c :: c : \frac{c^2}{t} = \text{Latus}$

$\text{Rectum} = a - t$ , by *Quest.* Theref.  $\sqrt{at - t^2} = c$ ; whence  $.7854tc = .7854\sqrt{at^3 - t^4} = \text{Area}$ , a *Maximum*. In Fluxions, and reduced  $t = \frac{3}{4} = 45$ , and  $c = \frac{1}{4}a\sqrt{3} = 25.98$ . — *W. W. R.*

*Mr. Robinson's Answer.* Put  $p = .7854$ .  $x =$  required Transverse,  $60 - x = \text{Latus Rectum}$ . Theref.  $\sqrt{60x - x^2} =$  Conjugate Axis; then  $p\sqrt{60x^3 - x^4}$ , or its Square, is a *Maximum*. In Fluxions  $180x^2x - 4x^3x = 0$ ; reduced  $x = \frac{180}{4} = 45 =$  Transverse, and  $25 : 9807$  the Conjugate Axis required.

*Mr. Stephen Hartley* answered it; as did *Mr. Jos. Scott*, *Mr. William Selley* (by Fluxions) *Mr. William Spalton* of *Renishaw*, *Mr. John Buckley* of *Rockdale*, *Mr. William Marsden* of *Netherburst*, *Derbyshire*, *Mr. Thomas Elliot* of *Mytton Bridge*, *Mr. Thomas Barrow* of *Welton School*, *Mr. Thomas Smith* of



of *Hetherfet*, Mr. *John Chipchase* of *Stockton*, *Durham*; Mr. *Joseph Denton*, Mr. *Alexander Rowe*, Mr. *Jonathan France*, and Mr. *James Lamb*, which Answers agree.

XVII. QUESTION 571, answered by Mr. James Lamb of Aldborough.

Puts  $s$  &  $c$  = Sine & Cos. Ang.  $ABC = 30^\circ =$  Ang.  $BED$ ,  
Rad. 1,  $d = 56.2789$ ,  $n = .7854$ ,  $x = AB$ , Diam. greatest  
Cylind. then  $2x = BH$ , its Length. By Trig.  $c : x :: s :$

$$\frac{s}{c} = AC = HE; \text{ and } 2x - \frac{s^2}{c} = BE; \text{ then, as } 1 :$$

$$2x \frac{s}{c} :: 2cx - s^2 = DE, \text{ Length lesser Cylind. And}$$

$$1 : 2x - \frac{s^2}{c} :: s : 2sx - \frac{s^2}{c} = BD. \text{ As } c : x :: 1 : \frac{x}{c} = H$$

$$BC. \text{ Therefore, } \frac{x}{c} - 2sx + \frac{s^2}{c} = DC, \text{ Diameter lesser Cylinder}$$

$$\text{Put } a = \frac{1 - 2cs + s^2}{c}, b = 2c - s, \text{ then } ax = DC, \text{ and } bx = DE$$

$$a^2 x^2 \times b x \times n = d, \text{ and } x = \frac{\sqrt[3]{d}}{bna^2} = 6.6633 \text{ Diam. AB lesser Cylinder}$$

$$13.3266 = \text{its Length. Whence } DC = 2.9542 \text{ Diam. lesser Cylinder}$$

$$8.208816 = DE, \text{ its Length. — } W.W.R.$$

Mr. *Thomas Robinson* answered it by an elegant and short Process in a similar Manner, and is very near the same Numbers.

Mr. *Stephen Hartley*, Mr. *Smith* of *Hetherfet*, Mr. *Denton*, and Mr. *Alexander Rowe* answered it.

XVIII. QUESTION 571, answered by Mr. Robinson.

Put  $a =$  Head Diam.  $2x =$  Bung,  $3x =$  Length,  $p = \frac{1}{4}$ . Therefore

$$\frac{43x^2}{15} \times 3x \times \frac{11}{14} = \frac{1419x^3}{210} = x^3 \text{ by Quest.}$$

Solved  $x = 4.307$ ,  $2x = 8.614$  and  $3x = 12.921$ , the Length.

Mr. *John Buckley* near *Rockdale*, *Lancashire*, answered it; as did Mr. *James Lamb*, Mr. *Watkins*, and Mr. *Thomas Barrow* of *Weton School*.

Mr. *Joseph James* determines  $x = 4.307944$  Head,  $8.615888$  Bung, and  $12.923832$ , and Content  $540$  cubic Inches Mr. *Rowbottom* and Mr. *Stephen Hartley* the same. Mr. *Jos. Scott*, Mr. *Ralph Taylor*, Mr. *John Peck*, Mr. *Smith* of *Hetherfet*, and Mr. *Alexander Rowe* answered it.

Mr. *William Penn* observes, that when the Bung = twice the Head Diam. that the Area of the Head  $\times 8.6 =$  twice the Content.

XIX. QUESTION 572, answered by Mr. Stephen Hartley.

Put  $x =$  nat. Sine of Latitude sought;  $a =$  nat. Tang.  $30^\circ$ ,  $b =$  the of  $75^\circ$  and Radius = 1. By Spherics,  $a x =$  Tangent of Two of the Clod



Hour Line, and  $b \times$  = that of 5 o'Clock. By the *Question*  $b^3 x^3 - a^2 x^2$  is a Maximum. In Fluxions,  $3b^3 x^2 - 2a^2 x = 0$ . Reduced and solved  $x = \frac{2a^2}{3b^3} = .00427 = 14'.42''$  the required Latitude.

Mr. Robinson of Biddick, Mr. William Hedley, Mr. Smith of Hetherset, Mr. John Chipchase, and Mr. Alexander Rowe correctly answered it.

## XX. QUESTION 573, answered by Mr. Robinson of Biddick.

TABLE OF COURSES.

Cour.	Dist.	Distance		Departure	
		N.	S.	E.	W.
	m.	m.	m.	m.	m.
W	74				74.0
NE	74	52.3		52.2	
S	74		74.0		
NW	74	52.3			52.3
E	74			74.0	
SW	74		52.3		52.3
N	74	74.0			
SE	74		52.3	52.3	
		178.6	178.6	178.6	178.6
		178.6		178.6	

Distances from Stations.

1st and 3d — 58 } Miles nearly.  
1st and 5th — 80 }

Mr. Jos. James found the Distances from

1st & 3d }  $\frac{c}{2}$  { 56.637149  
1st & 5th }  $\frac{c}{2}$  { 80.097025  
who observes it is evident, by the Table, that there cannot be either *Differ. of Lat. or Departure*; because the Ship arrives at the very same Port she departed from.

Mr. Stephen Hartley finds the Departures, as the Traverse proceeds = 52.3261 Miles, amounting to nothing in the End.

Mr. Weston, Mr. Thomas Barrow, and Mr. William Marsden answered it; as did Mr. Smith of Hetherset, Mr. Dutton, Mr. W. Gibson, Mr. Jos. Denton, Mr. Alexander

Rowe, Mr. John Wright of Aldbrough, Mr. Jonathan France, and Mr. Bathe.

## XXI. QUESTION 574, answered by Mr. Joseph James of Bishop Stoke.

Let the Three Equations be respectively multiplied by  $\sqrt{z}$ ,  $\sqrt{y^2}$ , and  $z\sqrt{y}$ ,

then, by comparing the 1st and 2d  $y = \frac{a^2 x^4}{b^2}$ , and from 1st and 3d,  $zy =$

$\frac{a^2 x^2}{c^2}$ ; also by 2d and 3d,  $z = \frac{b^2}{c^2 x^2}$ ; substitute these respective Values

last found in the 2d Equation, and it becomes  $\frac{a^2 x^4}{c^2} + \frac{ab^2}{c^3 x \sqrt{x}} = b$ ; from

hence  $x = 4$ ; consequently,  $y = 36$ , and  $z = 64$ . — W. W. R.

Mr. James Lamb answered it; as did Mr. Thomas Robinson, Mr. Stephen Hartley, Mr. Watkins of Bristol, Mr. Thomas Elliot, Mr. Rowbottom, and Mr. John Chipchase.

Mr.

Mr. *Alexander Rowe*, by a few Trials with the 8 Digits and their Squares, finds  $x = 4$ ,  $y = 36$ , and  $z = 64$ , as above. Mr. *Richard Batbo* solved it; as did Mr. *P. Barrow* of *Welton School*, and Mr. *James Lamb*.

XXII. QUESTION 575 was answered by Mr. Rowbottom, the Proposer.

REMARK BY THE PALLADIUM AUTHOR.

In such a Series of unknown Quantities, not only the best Printer must make Mistakes, but even the Transcriber. There being neither Instruction or Curiosity in these Questions, we shall decline inserting all such for the future.

$s = 11$ ; therefore  $d = 17831$ . Whence, with infinite Deduction and Quotation, a final Equation of the 4th Power results; hence  $x = 22$ , and the Lady's Age 22 Year, 2 Months, 1 Week, 3 Days, never attempted by any besides this Answerer and Proposer.

XXIII. QUESTION 576, answered by Mr. Joseph James.

Put  $x =$  lesser Number, then  $9 - x =$  greater; and, by Quest.  $9x^2 - x^3 = 54$ , where  $x = 3$ , and  $9 - x = 6$ , answering One Way. For the other Way, put  $y =$  the greater Number, then  $9 - y =$  lesser; and by Quest.  $9y^2 - y^3 = 54$ ; hence,  $y$  the greater Number  $= 8.196$ , and lesser  $= .804$  nearly. — *W. W. R.*

Mr. *Isaac Rowbottom* solved it the First Way in the same Manner. The Second Way he puts  $9 - x \times x^2 = 9x^2 - x^3 = 54$ ; whence,  $9x^2 - x^3 - 54 = 0$ , now dividing by  $x - 3$ , the Quotient will be  $x^2 - 6x - 18 = 0$ , or  $x^2 - 6x = 18$ . Therefore  $x = 3 + 3\sqrt{3}$ ; and  $9 - x$ , the greater Part,

$= 6 - 3\sqrt{3}$ , and  $3 + 3\sqrt{3} \times 6 - 3\sqrt{3} = 54$ , the other Way.

Mr. *Thomas Barrow* of *Welton School* solved it; as did Mr. *Thomas Elliot*, Mr. *Hartley*, Mr. *Peck* of *Sigglesthorpe*.

Mr. *Watkins* of *Bristol* determines One Part 2.655348, and the other 6.544652; also 1.341461, and 7.658539 by another Way of Solution.

Mr. *Scott* answered it; as did Mr. *Robinson* and Mr. *Smith* of *Hatfield*.

Mr. *John Chipchase* finds the Numbers 6 and 3, and  $3 + \sqrt{27} = 8.196152422706$  and  $6 - \sqrt{27} = .803847577294$  — *W. W. R.*

Sum 9 Proof.

Mr. *Alexander Rowe*, Mr. *Jos. Denton*, and Mr. *Richard Batbo* answered it.

XXIV. QUESTION 578, answered by Mr. Richard Judson of Beverly, the Proposer.

Put 22, the Yards in a Chain,  $= a$ , and call the Sine of Half the variable Angle  $= x$ , then the Cosine will  $= \sqrt{1 - x^2}$ . And by Trigonometry, as  $1 : a :: x : ax =$  Half the Chord of the whole Segment; and as  $1 : a :: \sqrt{1 - x^2} : a\sqrt{1 - x^2}$ , the versed Sine. Then, by a known Theorem,  $2ax + \frac{4}{3}a \times \frac{4}{15} \times a\sqrt{1 - x^2}$  will be the Area of the Segment, which per Question, is to be a Maximum. The Logarithm of the variable Part,



$2x + \frac{4}{3} \times \sqrt{1-x^2}$  will al'o be a *Maximum*. In Fluxions,  $\frac{2x}{2x+\frac{4}{3}}$  —

$\frac{x \dot{x}}{1-x^2} = 0$ . Reduced,  $x^2 - \frac{1}{2}x = \frac{1}{2} \therefore x = \pm \sqrt{\frac{19}{36}} - \frac{1}{6} = .55981646$

the Sine of  $34^\circ. 2'. 35''$  Half the *vertical* Angle : Then  $90^\circ - 34^\circ. 2'. 35''$   
 $\times 2 = 111^\circ. 54'. 50''$ , the Angle at the Center : Then, as  $S 111^\circ. 54'. 50''$   
 $: 22 :: S 34^\circ. 2'. 35'' : 13,275$ , the Radius of the *Fish Pond*, which, multi-  
 plied by 2, will give 26 Yards, 55 the Diameter required.

Mr. Hardy of *Cottingham*, by an elaborate Process, finds the Diam. =  
 1.20683 Chains = 26.55026 Yards.

Mr. James Lamb shortly answered it, 26.55 Yards.

Mr. William Penn observes, that the Perp. to the greatest Isosceles (or equi-  
 lateral) Triangle that can be inscribed in a Circle is  $= \frac{3}{4}$  of the Circle's Dia-  
 meter. If the Diam. = 3, then the Perp. = 2,  $\times d$  by rem. Circle's Diam.  
 $= 1$ , Product = 2, = Square of each Segment at the Base ; add Perp. Squ.  
 the Sum = 6 = the Square of the Side of the equilateral Triangle. As 6 to  
 9; the Squ. Diam. so 484 Square of the given Chord, to 726 a Square —  
 the Square Root of which = 26.944387, the Diameter of the required  
 Pond.

XXV. QUESTION 583, answered by Mr. William Marsden, Netherhurst,  
 Derbyshire.

Put $n = 465.92$ Semivibrations given	} From Dr. Smith's Harmonics, Prop. 24. and Corol. we have $P =$ $\frac{pln^2}{c^2d} = 9.636$ L. Avoird. the Ten- sion required.
$c = 3.1416$ Circle's Cir. to 1 Dia.	
$l = 12$ Inches	
$p = 10$ Grains	
$d = 39.126$ a Pend. vibrat. Sec.	
$P =$ Weight, or Tension, sought	

To find the Number of Beats in 10 Seconds of Time.

Let $\frac{n}{m} = \frac{2}{3}$ the Ratio of the 5th	} From the said Treatise of Harmonics, Prop. 2. Cor. 7. this Theorem is demonstrated ; viz. $\frac{s \times 2q}{161p+q} \times m$ $N = b = 17.34$ Beats, nearly as required.
$N = 232.96$ the given Vibra.	
$\frac{q}{p} = \frac{1}{5}$ of a Comma	
$s = 10$ Seconds	
$b = N^\circ$ of Beats sought	

To find the Temperament Sharp of such 5th to make double the Number of Beats in  
 10 Seconds, as by Question.

By the said Prop. 11. Cor. 7, we deduce this Theorem ; viz.  $\frac{161b}{2sNm+b} =$

$\frac{q}{p} = \frac{398}{1000}$  Parts of a Comma required.

Note. The Symbols,  $s$ ,  $N$ ,  $m$ , are as above ; and  $b = 17.34$  before found,  
 and consequently  $q = 398$ , and  $p = 1000$ .

H

Mr.

Mr. Thomas Elliot of Mythom-Bridge, Derbyshire, has given a Solution exactly agreeing with the above, by the very same Theorems from Dr. Rob. Smith's Harmonics, Master of Trinity College, Cambridge; who further observes, that the Number of Beats found for 10 Seconds of Time are G, the 5th above C, when tempered flat, by 1-5th Part of a Comma. That the Temperament Sharp, found of such Fifth, is in Parts of a Comma, to make double the Number of Beats in 10 Seconds of Time. Who appears to be an Adept in the Musical Science, by the Question he has proposed, but cannot, this Year, come in.

## XXVI. QUESTION 581, answered by Mr. Dutton.

		Vibr.	
AS 1 : r :: 2 : .5	Sq. Rad. = .70	Then,	$\frac{100}{100}, \frac{70}{100}, \frac{57}{100}, \frac{35}{100}$
3 : .38	_____ .57		$\frac{45}{100}, \frac{40}{100}, \frac{37}{100}, \frac{35}{100}$
4 : .25	_____ .50		1st 2d 3d 4th
5 : .20	_____ .45	Whence, Vibr.	100, 70, 57, 50,
6 : .16	_____ .40		5th 6th 7th 8th
7 : .14	_____ .37		45, 40, 37, 35, made when they all
8 : .125	_____ .35		swing alike, required.

The Proposer failed of sending his Answer (the 1st not kept) to compare. Mr. Alex. Rowe says, find the Time of Vibration of the several Pendulums, then find the Time of their first Conj. by Remark, p. 39, Pal. 1773, which divided by the Time of their respective Vibrations, will give the Number of Vibrations of each Pendulum. Quere.

## XXVII. QUESTION 582, answered by Mr. Thomas Robinson of Biddick.

PUT  $2x$  = Thickness of the Sides of the Brim of the Hopper,  $b$  =  
 $2150.42 \times 10 = 21504.2$  solid Inches,  $\frac{3b}{4x^2}$  = Alt. by 47. e 1  $\sqrt{\frac{9b^2}{16x^4} + x^2}$

$$= \sqrt{\frac{9b^2 + 16x^6}{16x^4}} = \text{slant Height.}$$

Th.  $\sqrt{\frac{9b^2 + 16x^6}{16x^4}} \times 4x = \sqrt{\frac{9b^2 + 16x^6}{x^2}}$  = superficial Area, which must be a Minimum. In Fluxions,  $64x^7\dot{x} - 18b^2\dot{x}x = 0$ .

Whence,  $x = \sqrt[3]{\frac{3b}{4\sqrt{2}}} = 32.51 \times 2 = 45.02$  Inches the Side of the Hopper's Brim; and it's Altitude 31.83.

Mr. Elliot of Mythom-Bridge, puts  $a = 10$  Bushels = 21504 Inches;  
 $x$  = Side of the Hopper's Base; then  $x^2$  = Area of the Base; and  $\frac{3a}{x^2}$  =  
 Alt. By 47. e. 1,  $\sqrt{\frac{2a^2}{x^4} + \frac{x^2}{4}}$  = slant Height; which  $\times^d$  into  $2x$  =  
 $\sqrt{\frac{36a^2}{x^2} + x^4}$  = Area of all the Sides, which, per Quest. must be a  
 Minimum. In Fluxions is  $\frac{72a^2x\dot{x}}{x^4} + 4x^3\dot{x} = 0$ .

Re-

Reduced,  $x = \sqrt[6]{18a^2} = 45.017$  Inches = Side of the Base  $\frac{3a}{x} = 31.833$

Altitude. Whence the slant Height = 38.916 Inches.

Mr. Rowbottom answered it; as did Mr. Dutton, Mr. Chipchase, Mr. Alex. Rowe, Mr. John Shadgett of Ross, Mr. Jonathan France, and Mr. James Lamb answered it.

XXVIII. QUESTION 558, answered by Mr. John Buckley, a Youth of Milnrow, near Rochdale, Lancashire.

LET  $x$  = the Number of Oranges that were in the Basket, and  $4+7+9+12 = 32 = a$ . Then, by the Quest.  $\frac{x-a}{3} + 4 = A$ 's Share; and be-

cause each of their Shares were equal,  $\frac{x-a}{3} + 4 = \frac{x}{4}$ , reduced  $x = 4a -$

$38 = 80$  Oranges; and each of their Shares = 20.

W. W. R.

Mr. Thomas Robinson and Mr. Thomas Elliot answers the same; but Mr. Joseph James, Mr. Watkins, and others, find the Number of Oranges that were in the Basket 56, and each Person's Share 14. On which Mr. Elliot observes, if the Question is considered this Way it is unlimited, and then the least Number of Oranges is 56, and 14 the Shares that Way.

Mr. John Parker of Ashby de la Zouch answered it by the latter Way.

Mr. William Marsden finds the same Numbers.

Mr. Wm. Penn, Mr. Dutton, Mr. Finninley at Thorney, near Peterborough; Mr. Alex. Rowe; and Mr. Jonathan France answered it by Trial, who calls this Question of the unlimited Kind. Mr. Richard Batho of Tilstock, near Whitchurch, Shropshire, answered it.

Prize-QUESTION answered by NUMERICUS.

To find the Probability of the Remainder of Life.

GENERAL RULE. From the Extreme of Life, in a healthful Constitution, and Place of Residence, deduct the present Age of the Person, and the Remainder will be the Complement of Life: the Half of which will be the Number of Years that Person has an equal Chance to live or die, after that Age.

Example. From about 88 Years (reckoned the Extreme of Life) take 45 Years, the Widow's present Age, and 43 Years remain, for the Complement of her Life; the Half of which is  $= 21\frac{1}{2}$  Years she has an equal Probability to live or die. Yet, as no Purchaser will advance ready Money to purchase all the Goods left by Will (Part of which are subject to decay) for that Term of her Life, a more moderate or middle Estimation, between the least and greatest Probability of Life, of about 18 Years, will more nearly correspond with the Approbation of Purchasers.

To find what Sum, in ready Money, the Widow ought to pay the Executors for the Purchase of their Possession of all the Goods 18 Years hence, allowing 4 per Cent. Simple or Compound Interest Discount to the Purchaser.

Plate valued at $\frac{1}{6}$ of 100l. the First Value	=	£. 33.3	} Present Value.
Utensils and Furniture $\frac{5}{6}$	=	166.6	
H 2			Value



Value after 18 Years Use ————  $\left\{ \begin{array}{l} \text{£.} \\ 33.3 \text{ as at first.} \\ 100 = \frac{6}{75} \times 1\text{st Value.} \end{array} \right.$

Whole Value of the Goods to the Executors 133.3 after 18 Years Use.

N. B. Any other Ratio may be used that is approved.

Now, the present Worth of £. 333.3 due 18 Years hence, allowing Simple Interest Discount (*Practical Arithmetician*, p. 340) =  $\frac{133.3}{18 \times .04 \times 1} = \frac{113.3}{1.72}$

= £. 77.51937 = 77*l.* 10*s.* 4*d.* 2*q.* ready Money the Widow to pay the Executors for their Reversion at Simple Interest.

Again, The present Worth of 1*l.* due 18 Years hence, allowing 4 per Cent. Comp. Int. Discount (by *Pract. Arithm.*) is .49363 *l.* which  $\times$  d by 133.3 = 65.81733 = 65*l.* 16*s.* 5*d.* 1*q.* the ready Money the Widow to pay the Executors for their Reversion allowing 4 per Cent. Comp. Interest.

£. 77.51937 | 77*l.* 10*s.* 4*d.* 3*q.* Simple } Interest.  
65.81733 | 65 16 4 1 Compound }

Difference 11.70204 | 11 14 0 2

From 200 £. First Value,

Take 133.3 Second Value,

66.6 Loss to the Executors, by the Wear and Decay of Goods during the Widow's Life, being her Advantage; who is not answerable to the Executors for Wear and Decay of Goods, nor for Accidents or Damage to them by Fire. They are liable to Repairs for her own Advantage, perhaps, as much as the Decay, above what it had been if the Goods had been sold, and their first Value of 200*l.* put out at Simp. Int. 8*l.* a Year, for her Use, for 18 Years, and then the Principal 200*l.* to go to the Executors for ever.

First Value of the whole Goods, in ready Money, between the Widow and Executors	£. 200		£. 200
		Comp.	Comp.
Deduct the Executors Right in ready Money	77 10 4 3		65 16 4 1
Remainder the Widow's Right in ready Money	£. 122 9 7 1		134 3 7 3
			122 9 7 1

Allowing 4 per Cent. Simp. or Com. Interest. — Difference £. 11 14 0 2

N. B. After the Widow paying the Executors for their Claim in the Value of the Goods, the whole Goods become her own Property, worth, in ready Money, to her, 122 or 134 Pounds odd, as above seen: one of which Sums the Executors should pay her in ready Money, to purchase her Right and Property in the Goods for her Life; who (if the Goods had been sold) would have had a Claim to the Use of an Annuity, or Simp. Int. of 8*l.* a Year for her Life. She equitably claims 134*l.* which is equal to the present Worth of an Annuity of 5.36 for ever, the annual Amount of the simple Interest;

whose present Worth (by p. 369, *Pract. Arith.*) =  $\frac{5.36}{.04} = 134*l.*$

*Academicus's* nearly agrees with the above Solution.

#### NEW PROPOSITION.

Any Sum is equal to the present Worth of an Annuity equal to that Sum's Simple Interest, at any Rate per Cent. per Ann. payable for ever. (See p. 369, *Practical Arithmetician.*)

The present Value of E, any equal Payment, or Annuity for ever (R being the Amount of 1 l. for 1 Year) will be  $= \frac{E}{R-1} = P$ , universally. In

the present Case,  $\frac{5.36}{.04} = 134 = \frac{4.02}{.03} = \frac{6.7}{.05}$  at 4, 3 and 5 per Cent. and

the same at any Rate per Cent. Simp. Interest; which is considered as a *New Proposition*, which holds universally true.

N. B.  $\frac{1}{R-1} = Y$ , the Number of Years Purchase, any Rate of Interest

is worth, and  $\frac{Y+1}{Y} = R$ , universally.

$$\text{Whence, } \left\{ \begin{array}{l} \frac{1}{.04} = 25 \\ \frac{1}{.05} = 20 \\ \frac{1}{1.03} = 33.3 \end{array} \right\} \text{Years Purchase at } \left\{ \begin{array}{l} 4 \\ 5 \\ 3 \end{array} \right\} \text{per Cent.}$$

N. B. These Rules will serve for buying and selling Estates, by the year, ly rents, at any Simple Interest per Cent. per Ann.

The foregoing Solution is built on the mean Probabilities and Circumstances, accommodated to the reciprocal Purchasers; being a random but practical Solution. There are other Rules, besides that given, for computing the Probabilities of Life, according to the different Bills of Mortality, Places of Residence, and Circumstances of Health and Constitution.

The Intent of valuing the aforesaid Goods, between the Widow and Executors, appears to be for putting a Choice upon the present reciprocal Purchase of them, at the valued Price. Otherwise a List of the Articles had been sufficient to deliver them by, to the Executors, after the Widow's Use and Decease.

N. B. The Wear and Decay of the Goods, to any Purchaser for the Widow's Life, are included in the Valuation at their first Price; which depends upon their Value at her Death deduced out of their first Value.

#### SOLUTION ON certain PRINCIPLES.

Suppose all the Goods to be sold after their Valuation for 200 l. (the Purchase of them to any Purchaser) and the Money put to Interest for the Widow to have its Use, instead of the Use of the Goods, for her Life; and, at her Death, the Principal to be possessed by the Executors. Her Claim will be the same as the present Worth of an Annuity of 8 l. a Year, payable for 18 Years, without Wear and Decay of Money, as of Goods. The present Worth of 1 l. Annuity for 18 Years (*Pract. Arith.* p. 385) = 12.65929; which  $\times$  d by 8 l. Annuity, = 101.27432 or 101 l. 5s. 5d. 3q. the Worth of the Widow's Life, in the Use of the Interest for 18 Years, which the Executors ought to pay the Widow in ready Money, to purchase her Annuity for Life. After which, 200 l. becoming due to the Executors, is worth, in ready Money, at 4 per Cent. Comp. Int. Disc. (1 l. being worth 49363  $\times$  d into 200) £. 98.726 = 98 l. 14s. 6d. 1q. (the Complement of 201.27432 to 200 l. viz. 98.72568). Because, 98.726  $\times$  d by 2.02582 (Amount

# THE BRITISH PALLADIUM, OR

(Amount of 1 £. for 1 Year, at 4 per Cent.) = 200 £. the Value of the whole Goods as sold. Also the present Worth of 1 £. Annuity for 18 Years = 12.65929 at 4 per Cent.  $\times 8 = 101.27432$  as before. By *Emerson's Miscellanies*, p. 118. the Worth of an Annuity to Age 45; 12.68 Years Purchase, £ 8. Annuity = £. 101.44 = £. 101. 8s. 9d. 2q. agreeing with the above certain Value very nearly — *W. W. R.*

REMARK. Mr. Richard Judson of Beverley, estimating the Widow's Life at 15 Years (which will be admitted, perhaps, between the reciprocal Purchasers) determines the present Values of the Plate and Goods from 33.3,

and 116.6 their First Values, and 33.3 and  $\frac{104.16 \times 5}{7}$  allowing for Decay

in Value as 7 to 5 (a Ratio, perhaps, to be admitted by the Purchasers) to be £. 20.83 and 74.4077 respectively, their Sum = 95 £. 238. or 95 d. 51. the present Worth of the Executor's Reversion (instead of £. 77. 10s. by the same Principles, but deficient Decay of Goods, and Life of the Widow) who finds the present Worth of 8 £. Annuity for 15 (instead of 18) Years, and  $\frac{5}{7}$  instead of  $\frac{6}{7}$  Decay, by the same Principles with those of *Numericus*. But this Correspondent solves One Part by *Probability*, and the other by *certain Principles*; making a small Disagreement.

Mr. Hardy of *Cottingham* proceeds upon the same Principles with *Numericus*, supposing 22 Years of the Widow's Life, and  $\frac{1}{2}$  the Value of the *Utensils* and *Furniture* lost in 22 Years to the Executors; but the Plate to retain its Value nearly. And so he determines, from the last Value 116 £. of the Goods, their present Worth to the Executors; viz.  $.49195 \times 116 \text{ £.} = \text{£.} 48. 18s. 10d.$  only, which the Widow ought to pay. The Complement to 200 = £. 151. 1s. 2d. the Value of the Widow's Property for Life. The First Part on *dubtful*, and Last Part on *certain Principles*, inferring doubtful Conclusions, like other Solutions on uncertain Principles. His Objection to *splitting the Difference* (like the *Hull Arbitrators*) in taking a *Mean* of the Widow's Life, as, in astronomical Observations, is a good *practical Rule*.

PALLADIUM AUTHOR.

## NEW ÆNIGMAS.

I. ÆNIGMA 278, by Mr. Isaac Gumley of Countesshorpe.

DEAR Ladies, awhile bid the Toilet adieu,  
And list to my Tale, ev'ry Word of it's true.  
I am, be it known, O ye delicate Fair,  
Your Friend most devout, your Delight, and your Care  
Yet all must allow, I'm a whimsical Creature,  
Embellish'd by Art, tho' the Product of Nature.  
Two Eyes I have got, that see wonderful Things,  
Two Ears, like yourselves, and a Mouth too that sings.  
Should you look for my Legs you'll discover but one,  
And as for my Arms, 'tis well known, I have none.  
My Face, like your own, is quite ruddy and fair,  
And my globular Back is well cover'd with Hair.  
Unaided by me, should you take e'er such Pains,  
'Tis an hundred to one, you'll ne'er conquer the Swains,  
Should you go to the Church, I'm sure to be there,  
At the Ball and the Play I do frequent appear.  
In your Bedchamber too, I discover my Face,  
Where I often appear with a wonderful Grace,

The



The Spark, that attends you with languishing Eyes,  
 Proclaiming his Love by the Depth of his sighs,  
 Tho' you like him quite well, and behave to him free,  
 Ne'er share half the Favours you grant unto me:  
 For I'm often permitted to lie in your Bed,  
 And, each Day, by your delicate Hands, I am fed.  
 The Men too united, my Usefulness own,  
 From the Poor in the Cot, to the Prince on the Throne.  
 Yet, wonder not much at my mighty Renown,  
 For I really inherit a permanent Crown.  
 After all I have said, and the Fuss made about me,  
 'T would be better, perhaps, if some Men were without me.

II. ÆNIGMA 279, by George Berridge, Yorkshire.

How now, Cousin *Pbilo*, what Racket appears,  
 With your *Squares* and your *Circles*, your *Cones* and your *Spheres*;  
 All these I have heard of, and often have seen,  
 But a still greater Wonder unnotic'd has been.

It is true, when I liv'd, that my Use was but small;  
 But now I am dead, I am useful to all.

When I'm sought for Advice, my free Counsel I give,  
 Which, with welcome Acceptance, Men gladly receive!  
 Then, strange to declare, tho' I counsel Men right,  
 Not one ever thank'd me for what they got by't.

My Counsel's modest, yet steady and true,  
 That none are misled, if my Words they pursue.  
 The Mathematicians have found me of Use,  
 Being form'd with right Angles, acute, and obtuse;  
 Tho' some of them slight me—Time there may be,  
 When they will be glad to take Counsel of me.

Perhaps some will say, that my Shape's not made known;  
 Sometimes I have Head, and som times have I none.  
 My Body is tall, I've for Legs no Occasion;  
 Having Arms two, three, four, as best suit my Station:  
 Then tell me my Name, if you'd make me your Friend,  
 And, if you will ask me, my Counsel I'll lend.

III. ÆNIGMA 280, by Mr. Joseph James of Stoke Bishop, near Bristol.

I frequent wander o'er the verdant Plain,  
 And there am follow'd by the youthful Train;  
 A greater Friend the finer Arts can't boast,  
 Without my Aid all Science would be lost.  
 The Learned say, I boast a nobler Fleece,  
 Than Witch-Medea gave the Prince of Greece;  
 The choicest Blessings from my Staple flow  
 That Mortals can experience here below.

"No Empire could exist without my Aid,  
 And I am known the chief Support of Trade.  
 To each known Language I Assistance lend,  
 And to all Learning am an useful Friend.  
 Cassini, Lock, Descartes, and many more,  
 When in Existence, did my Aid implore.

My Shape twofold is known, and form'd in Part,  
 By the known Rules of mathematic Art.

In Shape sometimes my Body will appear,  
 Broad, long, and smooth; hard, and *triangular*;  
 And Depth I've got—but what is yet more odd,  
 My Body's made sometimes of *Flesh and Blood*.

IV. ÆNIGMA 281, by Cælebs of Westby.

1. Let others sing of foreign Lands,  
 Wide *Oceans* cross'd to distant Strands,  
 And add to *Fame* still something new;  
 Unlike to *Those*, I will not roam;  
 Nor seek for Subjects far from home;  
 But treat of Matters *near* in View.
2. A Thing, ye *Fair*, which, to your Eyes,  
 Does in as many Colours rise  
 As richly grace the *beauteous* Bride;  
 In *Form* and *Station* various found,  
 And useful all the Nation round,  
 Concealing what you wish to hide.
3. When blushing *Morn* salutes the Skies,  
 And by Degrees bright *Sol* does rise,  
 I, by Degrees, am rais'd up high;  
 Again, when *Sol* his Course has run,  
 Descending with the Setting-Sun,  
 I screen from Dangers nigh.
4. But when, in Bed, you seek repose,  
 And fettering sleep your Eye-lids close,  
 By all, I'm held a faithful Friend;  
 When furious Winds your House surround,  
 Or Frost and Snow 'erspread the Ground,  
 My needful Aid you must commend.
5. At *Rout* and *Ball*, and *Playhouse* too,  
 Oft'times I'm seen, ye *Fair*, by you,  
 I there reveal each *Actor's* Fame;  
 And what may give ye more Surprise,  
 I duly guard your lovely Eyes,  
 From whence, with Ease, you'll find my Name.

V. ÆNIGMA 282, by Mr Stuchfield, Stepney.

1. Like *Death* I destroy, what most you enjoy,  
 But there's *Few* for that Reason disdain me;  
 The *Miser* Himself, tho' fond of his *Pelf*,  
 Will spare a small Sum to obtain me.
2. Lo, now I proceed, t'unfold a dark Deed,  
 For in Darkness is my Occupation;  
 All Day, in Disgrace, I not once shew my Face,  
 But at Night I repair to my Station.
3. The *Elusives* I hide of the timorous Bride,  
 When she first meets her fond *Lover's* Caresses,  
 My *Aid* I bestow, on the amorous Beau,  
 Who by Stealth his *Dulcina* possesses.
4. The *Partner* I have, I oft prove his Grave,  
 At Assemblies we cut a bad Figure;

It is always the Case, whene'er we embrace ;  
For I soon make him lose all his Vigour.

- s. My Name to explore, I'll give one Hint more,  
Sure my Name then with Ease you'll unriddle ;  
My Shape, I must own, resembles a Cone,  
And my Handle is plac'd in the Middle.

VI. ÆNIGMA 283, by Thomas Wood of Stoke Golding, Leicestershire.

Great *Secrets* I keep throughout the whole Nation,  
And am of great Use in every Station ;  
As Brethren I've many of very small Race,  
The Face of each other we sometimes embrace :  
Our *Form* is quite circular of plane Projection,  
*Black, red, and blue, or of other Complexion.*  
From *Home* I must go (you will pity my Station)  
Sometimes to the most remote Part of the Nation ;  
But before I am thought for the Journey complete,  
I am dress'd in Milk *white*, and you'll think me quite neat ;  
The *Secrets* I keep, when my Office is done,  
I'm ungratefully us'd for, by Father and Son.  
Of my royal Robes stript, and left naked, forlorn ;  
The white *Vestments* I wore, are now quite from me torn ;  
Tho' cruelly treated, I'm without Dread or Fear :  
My Name let be *publish'd* the ensuing Year.

N. B. Mr. Isaac Gumley's and Mr. James Wigham's Ænigmas, and Others, could not come in this Year.

☞ Those who send the best versified Answers to the following ÆNIGMA before Candlemas-day have a Chance, by Lot, to win 5, 4, and 3 Palladiums, without being defrauded of their Right by Swindlers and Sharpers.

PRIZE ÆNIGMA, by Mr. John Parker of Leicestershire.

Fam'd Artists, did you ever see  
A Thing more curious made than me ?  
Not all th' Adepts of Rome or Greece  
Produc'd a greater *Masterpiece*.  
My *Merit* let me just repeat,  
(*'Tis better to be good than great !*)  
I *Thousands* help to cloath and feed,  
Which is an *inestimable* Deed !  
My *Offspring* you ador'd may see,  
In Net-work and Embroidery ;  
They very beautiful are deem'd,  
And, by the *Ladies*, much esteem'd.  
For now, almost *Two hundred Years*  
(*As by Chronology appears*)  
Since I first hail'd my *natal* Day,  
And did my wond'rous *Form* display.  
I was contriv'd by Grace Divine,  
Whose great *Sagacity* did shine  
In my Formation—Hence, you see  
I am of no mean Pedigree.

Now I'm to *Vulcan's* Sons consign'd,  
By them new-moddell'd and refin'd ;  
My *Structure* charms the gazing Sight,  
And fills *Spectators* with Delight !

I

My



My *Competition* I'll reveal,  
 I'm made of *Wood, Brass, Iron, Steel.*  
 My *Shape's* oblong, my *Feet* are *Four,*  
 I've *Wheels* in *Number Half a Score*;  
 My *Eyes* are num'rous to recount,  
 Oft to *Four Hundred* they amount ;  
 To which my *Beard* is tantamount ;  
 And, be it to the *Artist* told,  
 My *Bellies* are as manifold ;  
 For ever craving to receive,  
 And, like the *Horse-Leech*, cry, *give, give!*  
 My *Master*, unrelenting, puts  
 A massy *Spear* quite thro' my *G—ts* ;  
 Which fix'd on *Poize*, and balanc'd so,  
 To hang in *Equilibrio*.

From me *Astronomers* may learn,  
 How *Planets* on their *Axes* turn.  
 I serve for *Use*, as well as *State*,  
 My *Traversings* to regulate.  
 My main *Support* is plac'd above,  
 By whose *classic Force* I move.  
 Sometimes slower, sometimes faster,  
 At the *Pleasure* of my *Master*.  
*Adieu*, adieu, you'll find I am  
 Known to the *Mayor of Nottingham*.

## NEW QUERIES.

## I. QUERE 252, by Miss Polly Stow.

How is the Freezing of Sea and Land Water performed ?

## II. QUERE 253, by Chronologicus.

In what Year before *Christ* was *March* reckoned the *First Month* ? And in what Year also, before *Christ*, and on what Account, was *January* introduced for the *First Month* ?

## III. QUERE 254, by Historicus.

In what Year, and by whom, was the *Cape of Good Hope* first discovered to *Europeans* ? Also, in what Year was *Cape Horn* first discovered, and who was the Discoverer ?

## IV. QUERE 255, by A Traveller.

What is, probably, the *greatest* Depth of the Sea ; also, to give a Rule for determining the Length of *Rivers*, without tracing them to their *Sources*.

## V. QUERE 256, by Mr. Joseph Hunt, at Winslow School.

*Qua Nix & Grando sunt ?*

## VI. QUERE 257, by Semper Idem.

To ascertain the Nature of the Sun's Substance (solid or fluid) and to account for the Transmission of Heat and Light from that glorious Body to all Parts of the *Solar* System, without apparent Remission thereof, or Diminution of that Body, since the Creation ?

## VII. QUERE 258, by Miss Polly Stow.

How is the Appearance of *several Suns* seen, at One Time, in the Heavens accounted for ?

## VIII. QUERE 259, by Miss Stow.

How is the Appearance of the *Rain-Bow* accounted for?

## IX. QUERE 260, by A Bombardier.

Upon what *Principle* is the prodigious and unequalled Force of *Gun-powder* accounted for?

## X. QUERE 261, by Logicus, M. A.

A considerable *Wager* is laid by *A* against *B*, that it is better to oil a *Wig* with *Honey* than to oil it with *Mustard*. And another considerable *Wager* is laid by *C* against *D*, that *Six Dozen Dozen* is a greater Number than *Half a Dozen Dozen*. All Four Opponents are obitinate in each other being right: How are these Two important Wagers (to be spent for *Ebriety* of the Company) to be decided?

## PRIZE QUERE, by Miss Polly Stow. Addressed to Mr. Isaac Gumley.

In what Year next ensuing, ye *Adepts* of Fame,  
Will th' *Epaſt*, *Sun's Cycle*, and *Prime* †, be the same? † *Golden N.*  
And please to inform me the soonest Year, when  
Those *Three* famous *Cycles* shall each be just *Ten*?  
If you answer me truly, brisk, willing, and nimble,  
Your Applause shall be mark'd with my *Needle* and *Thimble*.

## NEW REBUSES.

## I. REBUS, by Mr. Stuchfield of Stepney.

To a beautiful Month of the Year,  
What crosses a River pray join;  
And an amiable Fair will appear  
In whom all the Graces combine.

## II. REBUS, by W. Spalton.

What all the Clergy ought to be,  
What often in the Week we see,  
If duly join'd will shew you clear,  
When Gaiety and Sports appear.

## III. REBUS, by Mr. John Needham of Sheephead, Leicestershire.

When *Fifty* to a Female Sheep is join'd,  
A Town in *Surry* you, from thence, may find.

## IV. REBUS, by Mr. William Needham.

To Half a fam'd *Poet* † add a Lady's choice Liquor, † *of old*.  
And you'll find what's admir'd by the B shop and Vicar.

## V. REBUS, by the Reverend Thomas Vaughan, M. A. Morpeth.

A Title of *Honor* first Letter left short,  
Where a Traveller stops, Half a Gallon of Port,  
Add the First of what's longer than Time or old Age,  
What is pleasant to hear—you will find I engage.

## VI. REBUS, by Miss Stow.

The most of a *Tborn* and the first of a *Pen*,  
With what's next to a *Duchefs* connected, and then  
A Town's Name you'll see where a fam'd Poet lives,  
From whom the gay Ladies soft Rapture receives!

# THE BRITISH PALLADIUM, OR NEW PARADOXES.

PARADOX, *by Mr. W. Swift of Stow, near Lincoln.*  
A Bird brings forth, the Tribes of Birds among,  
With her own Milk she suckles her own Young.

II. PARADOX (geometrical) *by Mr. Swift. Addressed to Miss Stow.*  
With a round Stopper can you shew  
How an oval Space is fill'd?—I'll do as much for you.

III. PARADOX, *by Mr. Pen of Chalfont, Bucks.*  
One thousand Two hundred and Fifteen Pounds put in One fair Scale,  
And One thousand Pounds Weight in t'other—then neither will prevail.

IV. PARADOX, *by Mr. Jonathan France, Master of Hope School, Derbyshire.*  
Join a Place of great Depth to the Flux of the Sea,  
And a Town's Name in Derbyshire then you will see.

V. PARADOX, *by Geo. Eyre, Castleton, Derbyshire. Addressed to the Schehallien Astronomer, who (after M. Bouguer and M. Condamine, sent abroad to measure the Earth, had found the great Mountain Chimboraco, in Peru, attracted a Pendulum  $7\frac{1}{2}$  from a Perpendicular) discovered that One of the Caledonian Mountains, called Schehallien, attracted his Pendulum  $5\frac{1}{8}$  from the perpendicular Direction.*

Where my Cup † holds most Wine (above Stairs ‡ or below?)  
What Diff'rence it holds?—by your Skill let me know.

† Cylindrical;  $2\frac{1}{2}$  Inches Diam. and 3 Inches high. ‡ 8 Feet above the Ground Floor.

## NEW QUESTIONS.

I. QUESTION 585, *by Mr. Isaac Rowbottom of Westhallam.*

A owes B 400 £. whereof 60 £. is to be paid immediately, 70 £. to be paid at the End of 1 Year, 80 £. at the End of 2, 90 £. at the End of 3, and 100 £. at the End of 4 Years; but they agreed to make One Payment of the Whole. Required the equated Time, without Loss to Debtor or Creditor, allowing 5 per Cent. comp. Int.

II. QUESTION 586, *by Mr. Joseph James of Stoke Bishop.*

Given the Cycles of the Sun, Moon, and Roman Indiction, 22, 11, 10, respectively. Required the current Year, and also that of the Julian Period, by analytical Investigation.

III. QUESTION 587, *by Mr. Joseph James.*

Required the Probability, or Odds, of 6 Heads turning up at One Throw with Ten Guineas.

IV. QUESTION 588, *by Mr. R. Taylor of Oldham, near Manchester.*

The Length of a rectangular Parallelogram exceeds its Breadth by 18 Inches, and the Area of its circumscribing Circle exceeds the Area of the Parallelogram by 100 Inches. Required the Sides and Area of the Parallelogram.

V. QUESTION 589, *by Mr. P. Antrobus, at Denbigh, N. Wales.*

A Gentleman dying left 4 Sons, and 4 Daughters, with a Wife, to whom he bequeathed 500 Acres of Land, lying in the Form of a Circle, worth 25 £. an Acre. To his Sons he gave 4 equal Circles, the largest that could be inscribed in the whole circular Boundary of the Estate; to his Daughters he gave the 4 triangular Spaces contained; and to his Wife he gave the quadrangular curved Space in the Center of the circumscribing Circle. Required each Person's Share of the Estate.

VII.



## VI. QUESTION 590, by Mr. Antrobus.

ON the Verge of a Meadow, a tall Poplar grows,  
And a circular Stream does its Acre inclose;  
I would tether my Horse by a Rope to this Tree,  
To feed half an Acre; how long must it be?

## VII. QUESTION 591, by Mr. John Hamson of Helsby.

From three given Points to draw three right Lines to a fourth Point, required, whose Difference shall be given.

## XIII. QUESTION 592, by Mr. George France, Master of a School at Wormhill, Derbyshire.

Given the 3 Angles of a Plane Triangle, 30, 70, and 80 Degrees, respectively; in the Sides of which Triangle there are three remarkable Points, whose Distances are 460, 510, and 830 Feet from each other. To determine the Sides of this Triangle

## IX. QUESTION 593, by Mr. Judson of Beverly.

A Cone of Marble 20 Feet high, and Diameter of it's Base 6 Feet, is standing upright in a Gentleman's Garden, upon a horizontal Plane: Required the Position of a Rope, with one End fixed at the Vertex of this Marble Cone, so that the least Force or Weight that can be applied to the other End of the Rope shall be sufficient to overturn it.

## X. QUESTION 594, by Mr. Judson.

A Gentleman dying left his Daughter (11 Years of Age) an Estate valued at 1000l. to be paid her when she attained the Age of 21 years; but if she should happen to die before she came of Age, her Mother (then 50 Years old) to enjoy the same for her Life. But if the Mother and Daughter should both happen to die before the Daughter came of Age, then the Son or his Heirs, to have the Estate for ever. Required the present Worth of each Person's Expectation; allowing 4 per Cent. for the ready Money advanced.

## XI. QUESTION 595, by Mr. William Penn of Chalfont, Bucks.

A lent B 52l. at 5 per Cent. or 52 Shillings per Year; but at last B agreed with A, to take one Shilling a Week till the whole Debt was paid. Required the Time.

## XII. QUESTION 596, by Mr. Penn.

To pay a Debt, to Sir or Madam, I agree,  
Of Pounds 100, with Pounds just 10. Annuity;  
With Simple Interest 5 per Cent.—th' easiest Method let me see.

## XIII. QUESTION 597, by Mr. Penn.

Balladium Artists, can you think or say,  
What is the most a Pound will weigh; } † According to Norwood's Measure  
And the Place where † to me convey. } of 1 Degree of Latitude.

## XIV. QUESTION 598, by Mr. Dutton.

Here \* you may find an easy Cure for Life,  
If you are troubled with a drunken Wife.

$$\begin{array}{lcl} * m + w + x + y + z = 37 & \left. \begin{array}{l} xy + wz = 59 \\ w^2 - x + y - z = 35 \\ wx + w + z = 53 \end{array} \right\} & \begin{array}{l} \\ \\ my - x \times wz = 3000 \end{array} \end{array}$$

Note. *m*, *w*, *x*, *y*, and *z*, are the respective Numbers of the Letters in the Alphabet, which being duly joined is the *Nostrum* for performing the Cure.

## XV.

## XV. QUESTION 599, by Mr. Penn of Chalfont.

A Case cylindric, firm and good,  
 Contains one solid Foot of Wood, † † An Inch thick.  
 Its Length to Breadth, as One to Two,  
 What is it's Maximum, pray shew.

## XVI. QUESTION 600, by Mr. Chipchase of Stockton upon Tees.

Required what Rhumb Line revolves round our terraqueous Globe, between the Latitudes of 60 or 70 N. or S.? and what Parallel of Latitude does it cross, after making one Revolution?

## XVII. QUESTION 601, by Mr. Isaac Gumley.

AN Observer standing 30 feet Distance on this Side a Wall 12 Feet high, (whole Eye was 5 feet from the Ground) could discover the Top of a Tower standing on the same level Plain; but stepping 20 Yards back, he could then just see a Mark on the Tower, One Fourth of its Height from the Top: Required the Tower's Height, and its Distance from the other Side of the Wall.

## XVIII. QUESTION 602, by Mr. John Eyre, Castleton, Derbyshire.

Two musical Strings are Unison, the one with the Pipe of an Organ sounds C on the Cliff-Line; and the other sounds A, the sixth above Concert Pitch; What is the Breadth of each Pulse, or Wave of the Air of the Strings? and this Consonance of  $\frac{1}{6}$  being tempered flat, by  $\frac{1}{5}$  of a Comma, what is the Distance of Time between each Beat of this tempered Consonance? What is the Length of a Cycle of the Pulses? and of a Period of the least Imperfections? and what is the Temperament of such 6th tempered Sharp, making the Cycles and Periods of the same length, as when tempered flat, as aforesaid?

## XIX. QUESTION 603, by Alexander Rowe of Reginnis, Cornwall.

Required the Value of  $x$ , when  $\sqrt[3]{x^{\frac{2}{3}} \sqrt[3]{x^{\frac{3}{4}}}} \sqrt[3]{x^{\frac{5}{8}}}$  of an Hundred Weight is the greatest Quantity possible? and what Part of an Hundred Weight will that Quantity be?

## XX. QUESTION 604, by Mr. Ralph Dutton.

If a given Number of Horses in a Cart can draw a Ton Weight on a level Road, what Weight will the same Number of Horses draw with the same Ease, up a Hill which rises one Yard in 40?

## XXI. QUESTION 605, by Mr. T. Smith of Hetherset, near Norwich, Norfolk.

A Widow Lady has 1500 l. left her for a Legacy, which she has put out at 4 per Cent. per Annum, Simp. Int. the Interest of which amounting to 60 l. but finding that she requires 80 l. a Year for her Support, she intends to take as much from the Principal yearly, as the Interest for that Year comes short of 80 l. Required how long will the Money last her?

\* Whoever sends the best Answer to the following Question before the Beginning of April next, will be intitled to the Reward of 12 Palladiums.

## PRIZE QUESTION, by a Newtonian.

Addressed to the present Reverend Astronomer Royal at Greenwich.

Having the Observations of the Ingress and Egress of Venus at the Cape of Good Hope, and those of her Egress at Greenwich, to determine from thence the Sun's Parallax.

REMARKS

REMARK. Dr. Halley says, that by observing the Ingress and Egress of Venus, somewhere in the East Indies, 1761, and comparing them with her Exit observed here, the Sun's Parallax may be found.

Mr. Mayer says that the Parallax of the Sun comes out  $8''.83$ , without the Error of Half a Second, and that is from having the Second internal Contact of Venns with the Sun's Limb, observed at the Cape of Good Hope, and at Greenwich 1761. (See Mayer's Tables, p. 61 and 114.)

It is upon the Credit of these Assertions, that the above Question is formed, that we may see how much the Parallax comes out by fair Calculation, if it be resolvable that Way.

Now, as we have it asserted, by several able Mathematicians, that these Data are not sufficient, and consequently, that the Question cannot be resolved thereby, we therefore invite all our ingenious Correspondents, together with our Astronomer Royal, to try their Skill to resolve it. Otherwise it seems to us that we have no Way of coming at it in this Age, for want of proper Observations.

But the same Mayer says (p. 53, *Theor. Luna*) that the Sun's Parallax cannot be greater than  $7''.8$ , which does not differ from the Truth by a 24th Part.

As these Things do not hang well together, and that what we know of the Parallax has been deduced from the Observations made in 1761, we cannot help wondering what the Observers have been about, who were sent out to so many different Places in 1769. For, as far as we can learn, they have not made the proper Observations to get the necessary Data for resolving this important Problem; but have spent their Time in trifling Things of no Consequence.

The proper and necessary Data are, 1. the greatest Depth of Venus in the Sun's Disk, in order to get the Chord she describes, 2. The Length of Time in her passing thro' that Chord on the Sun's Disk, whatever other Data may be wanted to give the true Solution.

To the PALLADIUM AUTHOR.

S I R,

THERE is lately published a new Almanack, intitled, *The Lady's and Gentleman's Diary*, which, by the Title, would seem to be a Compound of the two we have had for many Years; but I find proves to be a different Thing, though published under the old Titles. But the Author puts the Cart before the Horse, by putting the Ladies first. This, as advertised in the News-Papers, promises several Improvements in the Mathematical Way, I shall take notice of some Things in it.

In Art. 2. About perfect Numbers he takes occasion to tell his Readers, that the Problem had been mistaken by Authors (such as Ozanam, Wolfius, Emerson, &c.) But this I say is not true; and an undeserved Scandal thrown upon these Writers; for every one of them has solved his own Problem, which is only this—To find a perfect Number. But this Problem is quite different; for it seems to be this—To find, generally, when  $2^n - 1$  is a Prime Number. And, after all his Efforts, he has left it at last unresolved.

Art. 3. Of placing a Sector in the Meridian, is quite unintelligible to me. If PZC (as he represents) be the Meridian, how can the Stars A, B, have the same Right Ascension? He makes a complicated Affair of it; perhaps

you



you can understand how it is ; but the Method is but of little Value. Besides, how can *One* find two Stars, that shall have exactly the *same* Right Ascension ? And perhaps the Place may not lie open to the North. There are far better and easier Methods than this.

In *Art. 5.* He names two Cases, which, he says, are the two most useful Cases in *Spherical Trigonometry*. The most useful Cases are those which are ofteneft used ; and if the two he mentions be used ofteneft with him ; others may be used ofteneft with other People : So there can be no *Rule* to judge by. He thinks those Solutions are best, which are done by *Tangents*, I suppose that all Solutions by *Sines* or *Tangents* are exact enough for any Use ; and further than that, is nothing but mere Curiosity. In these Articles he has produced Nothing that is new, except his using *Tangents*.

*Art. 7.* Is no more than what is common.

*Art. 8.* The Question is answered in the *Diary 1750* ; but the Process is not set down.

Then follows some trifling geometrical Problems and Constructions. And, at last, a Set of Questions I think nothing at all of.

I am, Sir, your humble Servant,

CRITICUS.

### R E M A R K S.

Mr. *Isaac Gumley* answered 2, 3, 9. and 18 Questions. Mr. *Shadgett* some of the first. Mr. *William Judson* of *Beverly School*, *Yorkshire*, answered 2, 3, 5, 7, 9, 16, and 18 Questions, methodized and correct, fit for Pattern Solutions, but came too late for Insertion.

Mr. *Hamson* of *Helfby* complains that he could not get a *Palladium* for 1776, though he paid for 12 to the Publisher. Many others complain the same, in *Cheshire* and other Parts. The *Prize-Winners* were deprived of their *Prize-Palladiums* for 1776 by the same Invader of their Property (who will never enrich himself by his Principles). The Invader of the *Manilla-Ransom*, in the same Manner, deprived the Victors of their pecuniary Reward, but could not deprive them of their Laurels. The *Palladium* Author has been invaded of several Copy-Rights by the Trustee of his Productions, by Promises of Reward, without receiving any from him. If the *Prize-Winners* are unjustly used in the Loss of their Merit, he has been a far greater Loser by the same Purloiner of his Property. They were but Fellow Travellers with him in the same Coach, and must not look up to him for their Losses he could not prevent, any more than save his own. The Collector, for the Present, has made his Escape ; but the Culprit must answer for his own Offences and Injustice. Let him consider whether he could not have done better for himself.

We remove all unjust Complaints and Objections laid at our Door, as Nuisances we will not abide and answer for. We gain Nothing—therefore Blame is not due for endeavouring to oblige our Correspondents. The Obligation is on their Side, not on ours, if they mean to support the *Palladium*.

We are blamed by One Correspondent for our Secretary putting him to the Expence of Postage for the *Palladium Supplement 1776*, tho' in Defence of that Work most Correspondents encourage. The *Palladium* Author's sole Expence of printing the said Supplement much exceeded the Expence of the Postage to his individual Correspondents, whom he intended to oblige.

Another

Another Correspondent complains of *Peregrinator* being annexed to some of his Productions instead of *Traveller*, his Signature, on a *London Excursion* from *Cheshire*.

Another complains of our Neglect and Disrespect for not detecting and amending his *Error*, which every Correspondent has an equal Right with himself to expect; as if our *Attention* were more employed on others Affairs than on our own. We can compare Notes, and numerical Conclusions of Answers, for a Proof of the Truth or Falshood of each other; but we cannot examine and go through all Processes, because it would be answering all Questions ourselves.

In the Decision of the *Prize-Solutions* our greatest Regard is to the Honour of our Work; wherein the Reputation of the *Prize-Winner* is included. If we gave preference to an inferior Solution, we should degrade our Work, which none, for the Value of a few *Prize-Palladiums*, of far less Worth than the greater Excellence of winning them, ought to expect. Yet we are censured for deciding on Answers to doubtful or trifling *Prize-Questions* (like the present Year's) by Persons who never attempt Competition, or appear in the *Lists* for answering the deep and scientific Prizes, (in which the most Ingenious have been most distinguished) by being *Judge* and *Jury* ourselves (tho' with Deference to others Judgment, consulted as Counsel), impeaching our *Partiality of Judgment*, which the Credit of our Work prevents; and therefore the *Censure* is without Reason, without Truth. If we inserted a *Prize-Solution*, without Reason for its Preference, we should be condemned by our own Conscience and Judgment, as well as by public *Disapprobation*. But all future *Prize-Questions* will lie too far out of the Reach of the present contending *Prize-Archers* to hit the Mark, or come near it. Who send us *Improprieties* and *Defects* for Ingeniuties, degrading to themselves and our Work, were they inserted: yet expect we should (like *Flatterers*) approve their Absurdities, and applaud their Sagacity.

We have not Room for an alphabetical List of the Universities in Europe, and their Dates of Foundation, nor the Traveller's *Precepts* and *Maxims*; but recommend a Book for its Utility, to be published by an eminent Bookseller (not a Mile from *Rag-Fair*), intitled, *The SWINDLER'S Patent Pocket Companion*. Containing the Principles and Doctrine of *L—ng*, *Deceiving*, and *Flinging*, &c. By *Jonas Ironside, Swindler and Patentee*. *Fronti nulla Fides*.

An Account of the *Palladium-Society*, with the *President*, *Vice-President*, *Treasurer*, *Counsel*, (by Rotation) and *Secretary*, with their Offices, and a List of the *Honorary Members*, the Orders and Rules of the Society, in a separate Account to be delivered with the *Palladiums* hereafter.

☞ *Ralph Lewis of Cromlington is expelled the Palladium Society, for confederating with the late Publisher of the Palladium, against the Honor and Prosperity of the Members in general, and of that Work; who therefore stands recorded in the Black Book,*

By the PALLADIUM SECRETARY.

On the New Palladium, by Mr. Isaac Gumley, Countesthorpe.

Once more the *Palladium* with *Lustre* appears,  
Having met with *Applause* for a Number of Years:  
May its Merit extend it to infinite Days,  
While it's Use we admire, and with *Rapture* we praise!

K

The

The Honorary *Palladium Button* to be worn on the Hat, or on Suits of Cloaths on public or private Occasions, as shall be approved by the Honorary Members, is exhibited in the following Representation.

A. A. A. *Armorum et  
Artium Amator.*



A Lover of Arts and  
Arms.

*Utriusque Minerva.*

Learning and Prowess.

FIGURE.—*Pallas or Minerva*, Goddess of Arts and Arms.

It is observed by one of our able Correspondents, that all our late *Astronomers* have not added one single Improvement to the *Lunar Theory* as Sir Isaac Newton left it, deduced from a Series of Observations, and since patched-up by Mayer and his Followers, for the *Calculus*, by Trials, nearly to agree with Observation for a few Years.—That the same Decay of Astronomy as is found among our *Astronomical Observators* since the Days of Gregory, Halley, Keil, &c. is found in our *mathematical Schools*, with Respect to Science and Philosophy, since the Days of Barrow, Newton, Locke, &c. also Hodgson, Simpson, &c. subordinate Teachers of Mathematics in public Schools. That Learning was on the Meridian in the former Part of this Age, and now is on the Decline towards the Horizon.

PRIZES WON. The 12 *Prize-Question Palladiums*, assigned by concurring, and not partial, Judgment to *Numericus*; in which laudable Attempt Mr. Judson, *Academicus*, and Mr. Hardy have their Degree of Merit. Mr. Isaac Gumley of Countesthorpe claims four *Palladiums* covered with embossed Paper, presented by Miss Slow, for his ingenious Advice in the Choice of a Husband. Mr. John Parker of Ashby de la Zouch claims 4; Mr. Thomas Smith of Lamberhurst, Kent, 3; Mr. Wm. Penn of Chalfont, 2; Mr. Rowe of Cornwall, 2 *Prize-Enigma Palladiums*, who are desired to send to Mr. COLE's for them by order in their own Hands Writing.

#### A D V E R T I S E M E N T.

Correspondents and *Palladium Members* are desired to send their Orders, and Money with them, for *Palladiums* they send for, at Booksellers Price, to Mr. B. COLE's, next the Globe-Tavern, Fleet-Street, London, and nowhere else, where they may have a Receipt for the Payment, and the *Palladiums* will be conveyed to them by the new Publisher, as soon as published, as they shall direct, to prevent Frauds and Abuse of their Property.

All Correspondents are likewise desired to send all their Letters (franked or Post-paid) to the above usual Place, (the sooner the better for their Notice) directed to the *Palladium Author*, or his Secretary; where they may be furnished with all sorts of correct mathematical Instruments; (and with new and correct Sea Instruments, and a ready Reckoners of a Ship's Way) sold at reasonable Prices. No Letters or Packets will be received, but such as come free or Post-paid.—Several have been rejected unpaid for, and the Writers Time lost.

Erratum. P. 60, l. 8, for  $\times 1$  read  $+ 1$ .

2d Edition of the *Practical Arithmetician*, far surpassing the 1st, is coming out, to be had at Mr. B. Cole's, Fleet-street, only.

THE END.



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